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EXTRACT

From an Act prescribing Rules for the Government of the State Library,
passed March 8th, 1871.

SECTION 11. The Librarian shall cause to be kept a register of all books issued and returned; and all books taken by the members of the Legislature, or its officers, shall be returned at the close of the session. If any person injure or fail to return any book taken from the Library, he shall forfeit and pay to the Librarian, for the benefit of the Library, three times the value thereof; and before the Controller shall issue his warrant in favor of any member or officer of the Legislature, or of this State, for his per diem, allowance, or salary, he shall be satisfied that such member or officer has returned all books taken out of the Library by him, and has settled all accounts for injuring such books or otherwise.

SEC. 15. Books may be taken from the Library by the members of the Legislature and its officers during the session of the same, and at any time by the Governor and the officers of the Executive Department of this State, who are required to keep their offices at the seat of Government, the Justices of the Supreme Court, the Attorney-General, and the Trustees of the Library.

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MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JANUARY 5, 1878.

VOLUME XXXVI.
Number 1.

An Improved Car Starter.

Mr. James Pritchard, of this city, has patented through the MINING AND SCIENTIFIC PRESS Patent Agency an improved arrangement of that class of devices for starting horse cars from a state of rest, in which the initial pull of the horses is applied directly to a ratchet wheel fixed in the car axle. This car starter has now been at work for four months on a car on the Mission street line of horse cars in this city, and has done its duty satisfactorily to the Superintendent, who acknowledges that its use materially helps the horses in starting the car and that it is simple in structure and durable. The engraving on this page shows the device as applied to a one-horse car or a two-horse car without a pole.

A represents one end of a street car and B the axle which connects the wheels at that end. D is the ratchet wheel, which is firmly fixed to the axle. This wheel is made in two parts, so as to be bolted on without taking off the wheels, and is formed with side flanges, which extend above the teeth on each side. The dog, or pawl, E, is pivoted at its middle to one end of a lever, F, the opposite end of which is pivoted to the end of a draw bar, G, so that the pawl will be directly above the ratchet wheel. The pawl is made, as shown, with teeth on its rear end and an enlargement, H, on its forward end, and it is pivoted at its middle to the rear end of the lever, F, the forward end of which is attached by a rivet to the rear end of a draw bar, G. The forward end of the lever, F, passes between two guides, N, N, and has a downward projecting lug, K, at its extremity, against the front face of which the end of a flat spring, L, presses, so that the rear end of the lever is pressed upward against the bottom of the car and retained there until it is necessary to use it, as hereinafter described.

The draw bar, G, extends forward underneath the car floor to a point under the platform near the end of the car, being supported and guided at suitable points by loops, N, N. A casting is secured to the underside of the front beam of the platform, which has a downward projecting arm, O, on one side of which is a stud or pin. A lever, P, passes up through the platform, its lower end having a circular recess which clasps the pin, while its upper end above the platform is attached to the rear end of a bar, S. The forward end of the draw bar, G, has a pin on one side, which enters a hole in the middle of the lever, P, so that when the upper end of the lever is drawn forward the draw bar is also drawn forward.

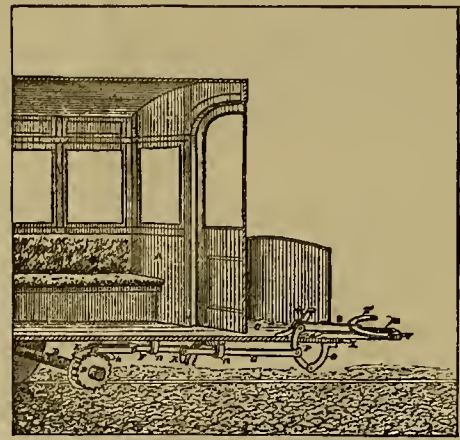
T is the whiffletree; U is a slot in a small piece of iron, V, bolted to the front end of the platform, over which the whiffletree moves, being attached so that it can move the length of the slot. The forward end of the bar, S, is attached to the middle of the whiffletree by a bolt passing down through the whiffletree and through the slot, thus connecting the whiffletree with the draw bar, G.

Now when the initial pull or draft comes upon the whiffletree, the upper end of the lever, P, and draw bar are drawn forward until the pin in the whiffletree reaches the end of the slot, U. As the dog or pawl, E, was in engagement with the ratchet when the draft commenced, this initial pull is directly exerted upon the ratchet, which by reason of the leverage and direct application of the power, starts the car easily forward. A pawl, W, is attached to the upper end of the lever, P, which engages with a notch or projection, X, in the car floor, when the upper end of the lever has been fully drawn forward and retains the entire arrangement in this position until it is released by the foot of the driver. By this same motion, by means of the connections and the spring, L, the lever, F, with the pawl, E, is raised up so that the pawl stands against the bottom of the car and clear of the ratchet, until the driver releases the pawl, W, when the spring, L, throws the whole arrangement into gear again.

This is intended for one-horse cars, but there is a simple method of disconnecting and clearing the main platform of obstructions, when used on a two-horse car. It can be used with

a pole or without, as desired. The entire arrangement is simple and free from the many objections heretofore urged against this class of car starters. In this class of devices the method heretofore adopted was to connect the rear end of the pole with the pawl which engaged the ratchet on the axle, so that the pole had a forward motion when the first pull came on it. This motion of the pole is objectionable. By Mr. Pritchard's method the pole, when used, is fixed in the ordinary manner and the whiffletree is connected with the mechanism that engages with the ratchet on the axle. The whiffletree is arranged to move a short distance in and be guided by a slot in the rear end of the pole, or a slotted bar and link, such as is described, when no pole is used.

The use of this device is a great relief to the horses, inasmuch as the labor of starting the load is greatly lessened. The Oakland Society for the Prevention of Cruelty to Animals, after examination, passed a resolution urging the adoption of this car starter on the different lines,



PRITCHARD'S IMPROVED CAR STARTER.

believing that it would be beneficial to the horses. The car does not start with a jerk when this device is used, but moves slowly at first, which will be a relief to passengers and avoid many accidents. Those desiring further information can address the inventor at No. 1006 Minna street. It may be well to state that the device can be applied to one-horse cars for an expense of \$20 each.

MARIPOSA ESTATE.—The Mariposa Land and mining company have won again in the action brought in their behalf, as well as his own, by



Enlarged Limnoria.

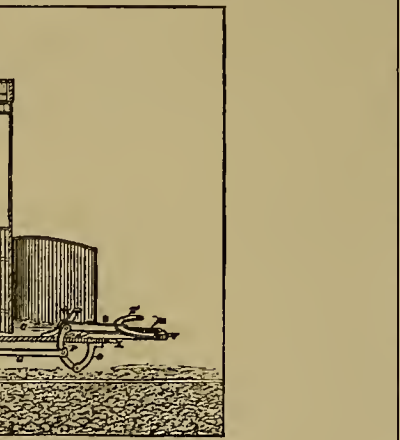
F. D. Walker, against Eugene Kelley and Joseph A. Douahoe, to restrain them from foreclosing a mortgage upon the Mariposa estate, and from taking any other proceedings against the estate or the personal property upon it. An injunction was granted by the Supreme Court of New York, sitting in Kings county on the 4th of October last, restraining such action. The Supreme Court, on the 28th inst., holding that this injunction had been violated, granted an order requiring Kelly show cause why he should not be punished for contempt of court.

BRITISH COLUMBIA MINES.—A dispatch from Victoria says: The formation of quartz mining companies proceeds briskly. New discoveries at Cariboo are reported daily. The two latest are the Wilkinson ledge, assaying \$90 in the outcroppings, and the Richfield ledge, assaying \$166 to the ton. These assays are made at the government office.

OAKLAND city property is valued by the assessment \$25,845,028.

The Wood Boring Shrimp.

The *Limnoria Terebrans* is a crustacea of the *Isopoda* order. The *limnoria* is about two lines in length, or about the size of a grain of rice, and of a dark ash gray color. The front outline of the body is a long oval, though the head is large, round, and strongly defined. The eyes are black, and are composed of numerous ascelli placed close together. The general appearance is like that of a wood louse. When disturbed or handled they roll themselves up like a hedgehog. These little creatures are wonderfully destructive to submerged timber, such as piles, docks, piers, bulkheads, etc. In the Bay of San Francisco they eat piles off entirely in a short time. The contents of the stomach consist of comminuted wood, showing that food is the object sought. They attack a



pile about half tide. The *limnoria* swarm around the timbers attacked in great numbers. They excavate little cells along the annual rings of growth, and while eating the wood for its albumen, as is presumed, make a sheltering place for protection from enemies, and in which to breed. The outside of the wood has a spongy look, and is very frail. A mass of these perforations as large as a hase ball taken into the hand and the water squeezed out leaves a mere



A Pile Eaten Off by Limnoria.



Knots Left by Limnoria.

pulp of woody fiber many times reduced from its original bulk.

The illustrations on this page show this timber-boring shrimp enlarged seven times. Another engraving shows the appearance of a pile eaten off by *limnoria*, and another shows how they leave the knots in their work. Mr. John P. Culver, an engineer of this city, has been investigating the habits of these creatures, and also the *Teredo navalis*, and has devised a plan to prevent their ravages, which we shall shortly describe in detail.

A VERY gratifying feature of this New Year's day in Washington was the general absence of wines and other intoxicating beverages from the tables of persons, either in public or private life, who received visitors. Washington has set at least one good example to other cities.

The steamer *Whipple* and *Chin-du-wan* collided during a fog in the Sacramento river, one day last week. The injuries were comparatively slight.

Double Seal Valve Trap.

We examined this week, at the model and machine shop of I. A. Heald, 514 Commercial street, a new sewer trap of peculiar construction, the invention of C. W. Garland of Oakland. The trap is of the same general shape of those commonly in use, its peculiarities consisting in the method adopted for shutting off the sewer gas, and preventing the siphoning off of water, which is the great drawback to most traps. In the proper place in the curve is a chamber in which a hollow ball is fitted, and this acts as a valve. When water is passing through the ball floats, and when it has stopped running the ball falls to its seat and shuts off any gas that may attempt to rise, remaining in this position when no water is passing. It also acts as a seal against the results of fermentation and prevents evaporation.

On top of the valve chamber is another small vertical trap. This is screwed in the top of the main chamber, and as soon as there is a tendency in the water to siphon off the little ball in the vertical trap stops the flow of water by admitting air proportionate to the bulk of water which has escaped. This valve takes the place of vent pipes and no sewer gas is allowed to escape into the air, as, while the ball admits air to prevent siphoning it also prevents any air or gas getting out, confining it within the pipes and sewer. Without this valve, when rooms or houses are not in constant use and the water in an ordinary trap evaporates, the pipes act as a chimney for the induction of sewer gases. The whole arrangement is very simple taken as a whole, although it was somewhat difficult to make the first models. In fact, Mr. Garland tried to have the models made by several others before Heald took hold of it. The ball valve has to be made in halves in order to have it hollow, and in joining the halves together afterwards it was found difficult to have it exactly spherical. Those made by Heald are very true. The ball is weighted so that the same side falls into the seat each time it operates making a perfectly water-tight joint. The little vertical valve is a perfectly new idea and does away with the necessity of vent pipes, making a perfect double seal valve trap. The first ones have just been completed. Mr. Heald having just finished the model, but they will soon be on sale at the various plumber and hardware stores.

BLACK HILLS MINES SOLD.—A dispatch from Deadwood, D. T., states that the Golden Gate mining company has consummated a sale of their four mines, the Father Desmet, Golden Gate, Justice and Belcher, to California capitalists, for the sum of \$400,000. This is the heaviest mining transaction that has occurred in the Hills. This being the case we shall probably see some Black Hills mining stock on the market before long, unless the mines are unusually rich, when the buyers will keep the stock themselves.

COMPLETE returns of the business transacted at the Bankers' Clearing house in this city for the year 1877 show that the total amount of exchanges effected during that period was \$519,948,804, of which \$497,407,380 was in gold and \$22,541,424 in silver.

THE settlement at the Mint preparatory to the incoming of the new Superintendent, is now in progress. During the year now ending the operations of the Mint have been unprecedented in the record of coinage in any institution in the world.

OFFICIAL intelligence has been received announcing the success of the Chinese troops in Kashgar. They had fortified Touchtonggan and Ask, two strong strategic points. The inhabitants were fleeing in terror into Russian territory.

SEVENTY-FIVE THOUSAND tons of Scranton coal were sold at auction at New York Friday by order of the Lackawanna Company. There was a large attendance, and prices were from 10 to 45 cents per ton more than last month.

CORRESPONDENCE.

It is the desire of the editors of this journal to be liberal toward all correspondents, and therefore statements and opinions are frequently published, on the authority of the writers, for which we do not assume responsibility.

Report of the Entomological Commission.

EDITORS PRESS:—The U. S. Entomological Commission, which was organized and placed under the auspices of Prof. Hayden's Geological Survey, for the purpose of investigating and reporting the entire subject of insect ravages throughout the western regions of our continent have completed their field labors for the present season.

The members of the Commission have been busily engaged in the preparation of the several parts of their annual Report, and will soon meet in Washington, where they will have a protracted sitting to get everything ready for the printer. This Report is looked for with much interest by the farmers of the West, and the character of the Commissioners is a guarantee that it will be creditable from the scientific, and valuable from the practical standpoint. The Report will contain 16 chapters, under the following heads: Introduction, Riley; Chronological History, Packard; Statistics of Losses, Thomas; Classification and Nomenclature, Thomas; Geographical Distribution, Thomas and Packard; Migrations and Meteorology, Packard and Thomas; Original Permanent Breeding Grounds, Riley, Packard and Thomas; Habits and Natural History, Riley; Embryology, Packard; Metamorphoses, Riley and Packard; Invertebrate Enemies, Riley; Vertebrate Enemies, Thomas; Remedies and Devices for Destruction, Riley; Prairie Fires vs. Locust Injury, Riley; Agricultural Bearings of the Subject, Thomas; Ravages of other Locusts, Packard and Riley; Locust Ravages in other Countries.

These chapters will embrace many sub-chapters, and the Report will be as exhaustive as the limited time for its preparation will permit.

In chapter four, the western extension and the northern and eastern limit of the species range are fully given.

In chapter five, the laws governing locust migrations are for the first time defined. A very large number of data have been collected in reference to the subjects of this chapter. Not only are the general laws governing the movements of the insect now defined, showing a regular migration southward and return migration northward, which may be counted on and foreseen; but many important and highly interesting facts in reference to their local flights are brought to light, which will henceforward form a part of the history of the insect.

In chapter seven, several other laws governing the species are also added; and the importance of the discovery of the laws which regulate the doings and movements of the pest, cannot be overestimated. In said chapter seven many new facts will for the first time appear, and all that is definite and accurate be made known.

Locust Destroyers.

In chapter 10 many new discoveries will be recorded, some of them of great scientific interest and importance. Of these may be mentioned the transformation of the silky mite (*Trombidium sericeum*). This is an eight-legged creature, which preys on the locust eggs. It is proved to be the mature form of the little six-legged mite (*Astoma gryllaria*), which is parasitic on the locust. Insects described under different genera are thus proved to be specifically identical. The life history of the blister beetles will also be given, their larvae feeding upon locust eggs and undergoing similar changes called hypermetamorphoses. The interest attaching to this discovery among entomologists as well as among farmers, is best appreciated when it is considered that absolutely nothing has heretofore been known of the larval habits of these blister beetles, notwithstanding the fact that for half a century much attention has been given to the subject by scientific men, on account of the commercial value of cantharis or Spanish fly, and of the great injury to potatoes and other plants committed by several of our American species.

In chapter 11 are given the locust feeding habits of many western animals not heretofore known to have that habit, and the good offices of birds are especially made manifest, examinations of the stomachs of over 90 species and 630 specimens having been made with special reference to their locust eating habits. The record in reference to these examinations is very full, giving the date, the locality, the common and scientific names of the species, and the number of locusts and other insects found in each. The value heretofore placed on these aids by entomologists is fully sustained by this record.

In chapter 12, which will be one of the most extended and most important practically, it is clearly shown that the young locusts may be

controlled, and by what means; while the way is pointed out how to better control the winged insects. Many valuable devices for destruction will be illustrated, among them one invented by Prof. Riley, which gave great satisfaction and will, it is believed, supersede all others as a cheap and practicable remedy, applicable at any season, whether the plants or the insects be small or large.

Losses by Locusts.

In chapters two and four are given statistics showing the immense losses inflicted on our western agriculturists by the locust. These chapters also show what crops are most liable to injury, and what are most easily protected—also the best methods of cropping in order to reduce the injury to a minimum. A chemical analysis of the dead locusts has been made and is unusually interesting. The insects furnish a new oil, which will be christened "caloptine," and a very large percentage of pure formic acid. Though this acid exists in the ant and some other insects, it is with difficulty obtained in large quantities, whereas by the action of sulphuric acid upon the locust juices it passes off with great readiness and in remarkable quantity and gravity. The various uses of this acid, whether as a therapeutic agent or as a laboratory reagents, etc., are capable of great and valuable extension, when it once can be obtained so readily and in such quantity.

The Report is expected to make about 500 pages, and will, it is hoped, be published in February or March. Although the Commissioners have divided the labor among them, the Report will form one complete whole, as the work of each will be discussed and revised by the Commission as a whole.

The annual Report, which is intended more particularly for the practical farming public, will be followed by memoirs of a more purely scientific nature—one by Dr. Packard on Anatomy and Embryology; one by Prof. Riley on the Natural History of other Locusts; and one by Prof. Thomas on the Classification of the Acrididae.

While it has been the object of the Commission to cover as much ground as possible, so as to make the annual Report as full and valuable as the time would permit, there yet remains several important subjects that it has so far been impossible to properly and exhaustively study. The territory affected is so vast, embracing over 1,000,000 square miles, that much of it was imperfectly explored, especially in the northwest. Mr. Riley had to cut short his investigations in British America, both for want of time and want of funds. For similar reasons, and on account of Indian troubles, Montana, Wyoming and Dakota have been but superficially explored.

Items of the Work.

The year 1877 was an abnormal year, i. e., the insect had, the previous year, overrun a large section of country in which it is not indigenous, hatched in such country in the spring. This was most fortunate for many reasons, as it enabled the Commission to carefully study the insects in this their unnatural condition, and to carry on experiments with a view of learning how to control them. Much of the work of the Commission was with these young insects. The losses sustained through the devastation of the pest by young and struggling frontier populations, ill able to bear them, was immense; and there was so much discouragement that hundreds and thousands of persons were on the point of abandoning their new homes last spring. At this juncture the Commission went into the field, and by its encouraging predictions (which were all verified) and commendations inspired the people with hope and confidence, and drew westward again the emigration that had almost stopped. All this work, however, interfered with needed investigations into the proper range, the native home and breeding grounds, the source of swarms, and many other important questions which can only be properly studied during a normal year. It is, therefore, very important that the investigations be continued until every question is settled that human investigation can settle.

For the proper settlement of some of the questions, the co-operation of the Dominion Government is desirable, and has been promised by the Canadian authorities, if the work of the Commission should continue.

It will be unwise to stop the work of the Commission before completed. The work should be made so thorough as to obviate any necessity in future years of creating another Commission for the same purpose. After careful estimates, it is concluded that the work can be satisfactorily completed only with two more years' investigation and experiment. The Commission therefore ask for a continuance of the appropriation of \$25,000 asked for a year ago.

There are various other injurious insects of national importance of which much has yet to be learned, and in addition to completing the locust investigation, the Commission contemplate, during the coming two years, studying and reporting on some of these worst enemies to our agriculture.

Much has yet to be done in giving practical form to the conclusions arrived at and plans proposed by the Commission to enable the work already done to bear proper fruit. To bring about the needed co-operation of the two governments, to cause proper laws to be enacted in all the States interested, and to enforce the truths that alone will make man master of the situation, is largely the work of the future.

R. J. S.

Washington, D. C., Dec. 22d, 1877.

The River Beds in Montana.

EDITORS PRESS:—In one of your recent issues I noticed in an article relating to river mining that the dredging machines of Feather and Yuba rivers had not proved a financial success, owing to the tailing deposits in their beds exceeding in places 25 feet in depth, a piece of information that astonished many who mine in countries where mountains are not moved. It is very evident that no machine could be a success with such an obstacle to overcome. But while the rivers of California, in consequence of that fact, offer no inducement to the average capitalist and practical miner, other fields are open where such machines would undoubtedly prove of great value and give enormous returns. It is a well authenticated fact that the Snake river of Idaho is rich in gold. Men have worked its bars and banks for years. On account of its swiftness no wing dam could stand, and its bed to-day, in the minds of all who are conversant with river mining in Idaho, holds millions of the precious metal in abeyance. But more especially to the rivers of Montana is the attention of the dredge-boatman called. The Missouri from the falls to its confluence with the Madison, Jefferson and Gallatin is rich, not one foot of its bed or bank but will give a sure prospect of gold and into it empties some of the richest gulches that have ever been discovered. The famous Confederate paid grandly, and \$100 to the pan was an ordinary prospect. No estimate of the amount of gold taken out has ever been made, but many millions undoubtedly were. El Dorado bar and the famous French bar diggings, also on its bank, gave up their riches, and to-day yield up large amounts of gold. The tributaries named, however, have been the means of enriching the old Missouri. Alder gulch, emptying into the Madison, in four years gave up the enormous sum of \$35,000,000 in Virginia's palmy days; since then millions more have been taken up, and millions yet remain, for Alder will be worked for years to come.

I could not if I wished, enumerate the gulches that have been worked, that empty in the Madison. But suffice it to say that gulches whose richness have astonished the world all have poured for ages into the lap of our grand old river their wealth of precious metal, and no more inviting field in the world is open to the capitalist than working the river beds of Montana. A large and sure return of gold is his reward, who shall venture, and no practical man understanding river mining can fail to meet with success and assistance by coming here. It is a new field and the outlay of capital is a most trifling one in comparison with the return that must inevitably be made. The bed of the Missouri and its banks are heavy deposits of gravel and throughout gold is evenly distributed. Working it by the ordinary process where its bed can be reached it will and does pay \$2 per man a day; what will it pay then if worked by a process that handles 130 tons an hour. Surely the most incredulous must, in the face of these facts, admit that there is money in it. Not an island on the river, between the points named, but is formed of gravel, and all of them ready at once to affirm the truthfulness of my assertion by showing gold in every pan of dirt taken from them. Then again there is no tailings to interfere with the successful working of the river anywhere. So gentlemen if your boats are not a success in California don't destroy them, don't let them lay up and rot, your machinery go to the scrap-heap; but gird up your loins, and with the indomitable energy of men determined to succeed, seek new fields and pastures. Come to Montana, and here you will find money and men willing and glad to assist in the development of their internal resources. The generous spirit that characterized the early Californians is a part of every Montanian, for a more liberal whole-souled people does not to-day live than they, for the truth of this no one will gainsay who has ever visited them. Her mines to-day are paying largely, the richest silver quartz that is taken out on this continent comes from her butte mines. Her placers will last years yet, and all through the Territory mills are pounding away on gold rock that pays largely. The opening of a new field, then, would give employment to much more labor and bring that most desired result, immigration. River mining, being in the minds of all mining men a paying institution, no trouble will be incurred by any one who has experience and machinery in raising capital enough to work on. To all such men Montana and Idaho send greeting.

SAND BAR.

Helena, M. T.

The Ice Works.

The ice manufacturing machinery is being put in place in two large buildings on the east side of the large reservoir of the water company on the divide. In one of the buildings is already in place a boiler and the foundation of the engine which is to drive the machinery is about completed. Adjoining this boiler and engine house is a larger building, in which is being set up the ice-making apparatus. Among this the most noticeable object is a tank of heavy sheet iron 30 feet long, 8 feet wide and 4 feet deep. In this will be placed the pans in which the ice

will be made. These pans are of galvanized iron and are 140 in number.

Among these pans circulates the brine, or non-congealable fluid, which, by its coldness, turns the water in the pans into ice. This cold fluid comes into the tank from a coil of pipe somewhat resembling the worm of a still, and from the tank passes back into the worm or coil of pipe. By means of a pump it is kept constantly circulating through the tank and coiled tube.

During that part of its journey when it is passing through the worm, the fluid is made intensely cold by the gas of a very volatile fluid called chymogene, which is let into the tank in which the worm is coiled. This chymogene has, also, its coiled tube or worm, into which it retires after it has done its work about the coiled tube containing the non-congealable fluid that freezes the water. In its coil or worm it becomes a fluid, but when it passes out into the tank it assumes the form of a gas, and in so doing produces an intense degree of cold. It is made to circulate by means of an air pump. The two pumps used are run by the steam engine, now being set up. The tank in which the chymogene is condensed is circular in form, and weighs 27,000 pounds.

It is expected that the apparatus will be ready to be started up about the 1st of January. It is warranted to make 20 tons of ice per day. In order to do this a hatch of pans of water must be frozen every five minutes.

The ice at present used by the honanza mines is brought from the Sierra Nevada mountains, and delivered here costs about \$20 per ton. It appears that when the supply of ice put up here was exhausted the ice companies in the mountains raised the price there, and the railroad company raised the price of freight; in self-defense, therefore, the ice machine was procured. Exactly what it will cost here to make ice with the apparatus is not known.—*Virginia Enterprise*.

Aurora District.

Some time since, when the Leopard mine was paying dividends, and Cornucopia was alive with miners, a party of prospectors discovered new mines near the fork of the Owhyee on the Winnemucca and Cornucopia road. Quartz was found in abundance and several claims located. A new district, called Aurora, was organized, a town site located and a few holes sunk on the principal leads. Two lots of ore were sent to the Humboldt reduction works here and worked \$83.80 and \$199.40 per ton, respectively. That was not considered rich enough to pay, as it had to be hauled here by wagons, a distance of over 80 miles, and work on the mines was suspended. Cornucopia experienced one of the "hack sets" peculiar to nearly all mining camps, and in consequence Aurora district was almost wholly abandoned. The discovery of the Grand Prize at Tuscarora, and the revival of the mining business at Cornucopia has led the owners of the Astor mine, at Aurora, which produced the ore worked at the Humboldt reduction works, to make arrangements to prospect the mine. For this purpose a company was organized in San Francisco and operations have been commenced on the lead. A shaft has been sunk to a depth of 50 feet, at the bottom of which the ledge is represented as carrying about two and a half feet of ore that assays from \$80 to \$1,000 per ton. The President of the company recently visited the mine and is so well pleased with the prospects that he recommended the levying of an assessment to develop it to a greater depth, with a view of building a mill in the spring. The indications are that the district is situated in the mineral belt which runs northward from Tuscarora and that the mines will prove equally as rich and extensive as those of that now celebrated camp. As Aurora is nearer Winnemucca than any other point on the railroad, it may be considered selfish in us to hope that it may prove one of the richest mining districts in the State, but that is certainly our wish.—*Silver State*.

CAGE AND CAR IMPROVEMENTS.—A new cage floor, composed of iron bars about a quarter of an inch thick, with about an inch space between, is now used at the Consolidated Virginia. Through this space the air in the shaft escapes to the surface and its resistance as the cage goes up or down is reduced to a minimum. To prevent the miners from slipping off the cages, a false brace has been devised, which is slid on the uprights of a cage whenever men are to be carried. This brace consists of an iron bar, half an inch thick by one and a half inches in width. One is put on each side of the cage. These braces have not been introduced in the other mines, but they soon will be. Another very useful device which is just being brought into use is a car truck, the axle of which is hollow. The wheels on one side are loose on the axle and revolve freely, while the axle remains stationary, and on the other side the wheels are tight on the axle, which revolves with the wheel. The axle being hollow, it will hold about a quart of oil and need not be oiled oftener than once a week. But the main advantage to be secured by the use of the new truck will be in making curves, the wheels on the shorter side of the curve remaining stationary or rotating slowly, as needed, while those on the longer side of the curve will revolve rapidly. And this is the special object of the invention; it is to enable carmen to make curves easily and thus effect quite a saving in the wear and tear of rails, trucks, etc.—*Virginia Enterprise*.

MECHANICAL PROGRESS.

The Indian Prize for a Ramie Machine.

INASMUCH as several Pacific coast inventors are now practically engaged in the honorable contest for the Indian award for a ramie cleaning machine, we give some facts from the circular which has been issued from the India office in London, on the subject. What is required is a machine or process capable of producing, by animal, water or steam power, a ton of dressed fiber of a quality which shall average in value not less than £45 per ton in the English market, at a total cost, including all processes of preparation and all needful allowance for wear and tear, of not more than £15 per ton, laid down at any port of shipment in India, and £30 in England, after payment of all the charges usual in trade before goods reach the hands of the manufacturer. The processes of preparation are to be understood to include all the operations required subsequent to the cutting of the stems from the plants in the field until the fiber is in a condition fit to be packed for conveyance to the market. The machinery employed must be simple, strong, durable and inexpensive and should be suited for erection in the plantations where the rehea is grown. It must be adapted for treatment of the fresh stems, as cut from the plant. The treatment of dried stems offers certain difficulties, and the fiber prepared for them must, moreover, always be much more costly than the fiber produced from green stems. It is, therefore, desirable that the attention of inventors should be given to the discovery of a process for the treatment of the green stems.

The trials will be held at Saharanpur, in the Northwestern Provinces, in the months of August and September, 1879. Machines entered for competition should be ready for trial not later than August 15th, the competition commencing the next day. The judges will be appointed by the government, and they will watch the whole of the trials. But the machines are to be worked and adjusted by the competitors themselves. The government will provide accommodation and motive power at Saharanpur for all competing machines, and will also pay for the transport from the seacoast to Saharanpur of all machines up to the limit of one ton each, the freight on excess weight to be defrayed by the owners. The owner or owners of the successful machine or machines shall not be entitled to receive the reward offered, except on the following conditions, viz.: That a complete technical description of the machine, illustrated by plans drawn to scale, shall be prepared and published (government paying the cost) for the information of the public, and that after the expiration of three years from date of award, the public shall have the right of manufacturing similar machines, on payment to the owner of a royalty of 10% on the cost of each machine so manufactured. All persons desiring to compete are requested to make known their intentions not later than December, 1878, giving their name, residence, profession and a brief description of each machine entered for competition. They must also declare themselves bound to conform to all rules which may be prescribed by the judges appointed to conduct the trials. All notices of intention to compete and applications for information should be addressed to the Secretary to the Government of India, Department of Revenue, Agriculture and Commerce, Calcutta.

How an Axe is Made.

A writer in the *Polytechnic Review* describes the process of axe making as now practiced in our largest American factories. There are several departures from the old method, and these we note as follows: Formerly the polls or heads of axes were made by drawing down a bar of iron from the middle each way, leaving the thick part for the head, the thin portions forming the eye and the embracing flaps for the reception of the steel hit. But it was found that the welded portion below the eye was liable to split in use. The present method is to form the poll from a solid bar of iron. This is done by a machine that operates two punches simultaneously to form the eye for the reception of the handle. The attendants of this machine take the bar and, after heating it, place it under shears that cut off a piece just sufficient for the poll, which piece is placed in the machine, the two punches working from either edge, a supplementary punch finishing the eye and a set of dies forming the sides, when the poll drops, still red hot, ready to receive the hit. There is no welding around the eye by this method, and consequently no danger of producing a "cold-short." After the insertion of the steel hit and shaping the axe are done by ordinary forging.

The axes are then sent to the hardening and tempering room, which is partially darkened, so that no ray of sunlight is admitted to mislead the workman, who depends entirely on the sense of sight for the perfection of his work. The hardening ovens are circular, having a vertical shaft in the center to which are attached rotating tables, on which the axes are laid with the hits toward the outside. The table turns slowly but continually, bringing the axes over furnaces of anthracite coal alternating with spaces. When brought to the proper redness by heat, the axes are hung on hooks on a revolving frame, the hits dipping into a tank of brine,

which is kept in constant circulation by a pump. When cool, the axes are brittle and must be tempered, which is done by heating them in a rotary oven like that used for the hardening, except that the fuel used is charcoal. One of the batch of perhaps 200 which are tempered, or drawn, at one time is brightened, and serves as a test of all the others, the rotary action of the shelves insuring equal heating. When the brightened axe shows the right color, the entire batch is removed, and are then ready for subsequent finishing operations of grinding and polishing. One axe out of each batch is broken after tempering to test, not only the temper, but the quality of the steel. The grinding is done on Nova Scotia stones from six to seven feet in diameter.

DRILLING FOR PRIZES IN COLORADO.—A contest of considerable interest to all rock drillers was held in Colorado recently. The *Sunshine Courier* says that at the recent Boulder county fair, \$60 and \$35 were offered in premiums to the pair of men and single man who drilled the greatest depth in granite blocks in 10 minutes' time. The contestants were to furnish their own tools. The match was open to the whole State. No limit was fixed to the number of drills used by each within the allotted time. The *Sunshine Courier* presented the result thus: The Yates Brothers, of Sugar Loaf district, won the double handed match, drilling 16.2 inches within the given time. C. M. Johnson, of Corning tunnel, won the single-handed match, drilling four drills, and reaching a depth of 9.1 inches. We presume the men were sadly "blown," at the end of the 10 minutes; since the fact is, that the least depth—5.3 inches—is extra work for a man when not working against time.

ILLUMINATED NUMBERS.—The *Telegraphic Journal* says that a contrivance for rendering the numbers of houses visible by night is becoming general in Paris. It consists of a hollow triangular prism nine inches long, two of whose sides are formed of panes of blue glass, on which the number of the house is picked out in white. This prism-shaped lamp-glass rests against the front of the house, so that the two sides with the numbers on them can be plainly seen by the passers-by. In the interior of the prism is a gas jet, fed by a pipe from the house. Householders on the Avenue de l'Opera have been obliged to supply this mode of numbering at their own expense on the houses they are building, and the municipal authorities have introduced it on some 450 of the municipal establishments, schools, police offices, fire brigade offices, etc.

NEW SEWING MACHINE MOTOR.—We read in Eastern exchanges of a new sewing machine motor, which is said to be "so cheap and so simple that it seems as if it would at once come into very general use. The motor consists of a tubular boiler 18 inches high, incased in cabinet work, through which steam is engendered by a small parlor lamp being placed underneath it. The apparatus which connects it with the sewing machine is very simple, and consists of only three pieces. It takes only a few minutes to get up steam, and the speed is regulated by a little spring. The invention is compact, neat and clean, a great savior of health and strength, and in appearance resembles a little parlor stove incased in cabinet work. The inventor of the machine is Mr. Thomas T. Wood, of Newark, N. J."

REMOVING A WRECK WITH HERCULES POWDER.—A Cleveland paper tells of the venture now being made to remove the hull of the steamer *Great Republic*, from the river at St. Louis. The stern lies in about 40 feet of water and the bow on shore. Divers go down into the hull and scrape the mud from off the bottom planks and then place a row of cartridges of Hercules powder entirely across the inside of the hull, cover them with mud, and explode them with an electric battery. The result of this is to cut off a section entirely across the hull, which is easily hauled out into the river and disposed of. About 12 feet-sections are to be taken at a time, and by the valuable services of "Old Hercules" (the explosive in use) the remains of the once grand steamer are quickly, but not quietly, disappearing from sight.

IMITATION OF MARBLE.—According to Herr Karl Boschan and the *Polytechnic Review*, casks of gypsum or papier mache can be prepared to closely imitate marble, by the application first, of a coating of thick Damar varnish, giving the appearance of alabaster, and upon this, when dry, a second coating on which crystallized gypsum is sprinkled, not too finely ground. This procedure is in imitation of nature, for alabaster is composed of very fine crystals of sulphate of calcium, and Carrara marble of somewhat larger crystals of carbonate of lime, which reflects light and glitter similar to crystallized sugar; the same effect is produced by the crystals of gypsum.

Bronzing Cast Iron.—The bronzing of cast iron can be accomplished, according to Dr. C. I. Durre, by coating the surface of the iron (cleaned by acid and well etched) with ferro-cyanide of copper, applied with linseed oil. Before this coating is entirely dry, the bronze powder is applied by means of a fine brush, and then well polished by means of a burnisher. After the surface is entirely dry, it is well washed and etched to the color desired. The use of the alkaline sulphides for the etching produces olive-green and black colors, which closely resemble those on the Japanese bronzes.

SCIENTIFIC PROGRESS.

A Prescription for Phylloxera.

An Italian, Signor Torrionetti, has been treating the phylloxera evil very much as doctors treat a compound malady, by applying a remedy made of ingredients to reach all points. He aims to invigorate the vine and at the same time kill the insects. A German agricultural journal thus describes his process and its results: Having observed that poor land is particularly favorable to the development of the phylloxera, Torrionetti lays great stress upon the necessity of liberal manuring in conjunction with the application of such chemical agents as may be employed for the direct destruction of the pest. In his own practice he uses a mixture of 50 grammes of Peruvian guano, 2 grammes of acetate of baryta, 2 grammes of acetate of lead, and 1 gramme of acetate of zinc, for each plant. The method of application is extremely easy, the mixture being simply put into a small hole about six inches deep at the root of each vine stock, and immediately covered in with earth. The guano furnishes the necessary manure for the nourishment of the vine, and the other three ingredients, as soon as they are dissolved by the moisture of the earth, penetrate all parts of the plant with astonishing rapidity, and cause the death of all insects upon it without the slightest injury to the vine itself. At present Signor Torrionetti has treated about 500 vines in this manner, and has met with complete success in every case.

TESTING THE INFLUENCE OF FORESTS.—Towards the close of last month, says the *London Farmer*, a series of preliminary experiments upon the meteorological influences of forests were commenced at the Botanical Gardens attached to the late School of Forestry at Mariabrunn, a special form of apparatus contrived for this purpose by Prof. Schwackhofer being employed in conducting them. The apparatus consists of a captive balloon furnished with an arrangement for the direct volumetric estimation of the watery vapor present in the atmosphere, which balloon can be quickly inflated when its ascent is desired, by means of a compact portable apparatus for making hydrogen gas that is attached to it. In its ascent the balloon is made to carry up a contrivance for the absorption of air at whatever altitude it may be allowed to come to rest, and in this manner material will be obtained for the analysis of the atmospheric strata immediately above the crowns of forests, and in similar inaccessible places. The preliminary experiments have given every satisfaction as to the feasibility of the scheme, and in the spring of next year a regularly organized system of observations will be undertaken at various meteorological stations in the country.

INFLUENCE OF PRESSURE ON COMBUSTION.—M. V. Wartna has been making experiments on the influence of pressure upon the phenomena of combustion. He has burnt stearine candles in the air at an ordinary pressure, and at a pressure of 1.95 atmospheres in a large iron chest, determining in each case the quantity of matter burnt per hour. Those burning at a common pressure had a flame of 4.5 to 6 centimeters in height, and consumed hourly from 9.34 to 10.70 grams of stearic acid. At the increased pressure the flame was very sooty, of a yellowish-red, and from 9 to 12 centimeters in height, but the quantity of stearic acid consumed was only 7.99 to 9.11 grams. He burnt also candles at very low pressures, as, e. g., 9 centimeters of mercury. The flame was much increased, lost its brightness, and took a greenish-blue color. Three portions could be plainly distinguished—the central part of a greenish-blue, quite detached from the wick, and having the form of a cap. This part is enveloped in a violet mantle, and this again in a second violet mantle, so pale as to be scarcely visible.

CANADIAN ENTOMOLOGY.—To the Canadians belongs credit for maintaining an entomological society in vital form, and the *Canadian Entomologist*, which is the organ of this society, can claim a like preeminence in the entomological literature of this country. The editor, Mr. Wm. Saunders, is well known, and has rendered good service toward the increase of entomological knowledge, both by his investigations and his general writing on the subject. The *Canadian Entomologist* is published at London, Ontario, Canada, and serves a record hook for the latest advances in the science of insects. We notice that many of our eminent United States entomologists use it as a medium of communication. The fee for associate memberships in the "Entomological Society of Ontario" is \$1.25 per year to Americans, which includes a copy of the monthly publication.

TELEPHONE AND DEAFNESS.—The *American Manufacturer*, of Pittsburgh, Pa., says: A new discovery in relation to the telephone has just been made in this city. A gentleman, who is deaf in the left ear, so that he cannot hear through ordinary speech, finds that on applying the telephone close against that ear he can hear even a whisper with perfect distinctness. We may soon see deaf persons with telephones fastened to their heads, instead of carrying ear trumpets.

TRANSPARENCY OF IRON HEATED TO REDNESS.—It has been affirmed by P. Seechi, of Rome, that iron heated red is transparent to light. This is denied by M. Govi, of Turin, who, in a paper to the French Academy, as reported by *Nature*, describes some experiments on the subject, and shows how one may be deceived in studying the phenomena. If a mixture of borax and carbonate of soda be fused in a thin platinum crucible raised to a red heat, there will be seen on the exterior of the vessel the form of the liquid mass with all its accidents of rapidly varying form, indicated by a zone of less brightness than the upper portion of the metallic surface. At first sight it is natural to infer a transparency for light of the heated platinum, but (M. Govi points out) the case is really one of transparency for radiant heat; that is to say, a phenomenon connected with the good conductivity of platinum. The liquid, liberating carbonic acid, is less hot than the crucible, and is constantly borrowing heat from it. It is inevitable, then, that at every point where the liquid touches the metal, the latter relatively cooled, should appear less luminous than in the neighboring region. M. Govi gives some other examples of the phenomenon.

ENGRAVED GLASS.—Very few chemical agents act on glass, the principal one being fluorhydric acid, which is employed for engraving. Its action is, however, very rapid, and its use so dangerous that special precautions must be taken. Another and a safer way of engraving glass than that with this acid, the *Jeweler* gives as follows: A coat of engraving varnish is put on the glass with a pencil. The varnish, which goes by the name of "Florence," is one of the best. It is heated in a varnish pot and linsed oil and mastic in drops are added in equal portions. Mix and pass through a cloth. Keep in closely stoppered bottles. The varnish is spread so as to leave the parts to be engraved uncovered, that the drawings may be traced with a metallic point. A paste of fluoate of lime in powder and concentrated sulphuric acid is put on in a thin layer. This paste acts slowly on the glass wherever it is not protected by the varnish. It is left for two or three hours. The glass is then cleaned first with water and afterward with alcohol.

EXPLORATION IN THE INDIAN SEAS.—Measures are afoot, (the *Athenaeum* says) for supplementing the researches of the *Challenger* expedition by a series of deep-sea dredgings in the Indian seas. These seas were purposely omitted from the scope of the *Challenger's* investigation, as it was then hoped that the establishment of a marine surveying agency would enable the Indian government to carry on deep-sea dredging and sounding *pari passu* with coast surveying. But although the Duke of Argyll warmly approved of the object, it has hitherto been impossible to do anything, owing to the want of a good steamer and all necessary equipment. A new steamer is now being built in India, and an officer of the Coast Survey Department, Lieut. Jarrad, R. N., has been commissioned to see after the fittings and dredging appliances in England. It is hoped that operations may be started next cold season (1878-79), probably, in the first instance, in the Bay of Bengal.

AERIAL TELEGRAPHY.—The scheme for telegraphing without wires, by means of aerial currents of electricity, has been revived by Prof. Loomis. He has met with success in using kites for this purpose, a copper wire being substituted for the usual kite string. Signals were transmitted thus between kites 10 miles apart. His new experiments are made in the mountainous regions of West Virginia, between lofty peaks. Continuous aerial currents are found at these altitudes, which will serve the purposes of the telegraph, except when rarely interrupted by violent disturbances of the atmosphere. A scheme is now on foot to test the merits of aerial telegraphy in the Alps. The cheapness of the apparatus, as no wire is required between the stations, is greatly in favor of the method, and may counterbalance its liability to occasional interruption.

THE LICK TELESCOPES.—The *Manufacturer and Builder*, alluding to the proposition to erect two telescopes with the Lick fund, one a great refractor of the largest possible size, the object glass at least 40 inches in diameter; the other a reflecting telescope, of which the mirror should be at least four feet in diameter, adapted to use two kinds of mirrors, one a speculum metal reflector, and the other a silvered glass reflector, says: "We are confident that if this plan is realized, startling discoveries are in store. California, with its monster telescopes, aided by its clear sky and otherwise favorable situation for astronomical research, will undoubtedly take the lead in discoveries, of which those of the moons of Mars, made with what is now the largest refractor in the world, have given us a foretaste."

STRAIGHTENING TOOLS.—The *Polytechnic* says: It is not generally known that steel tools sprung in hardening can be straightened in tempering. Hardened steel, when not enough to change the color to straw color or purple, is about as pliable as annealed steel when cold. So pieces warped in hardening can, while hot, be straightened with a hammer, or, better, with a screw-press, without danger of breaking.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Dec. 13.	Week Ending Dec. 20.	Week Ending Dec. 27.	Week Ending Jan. 3.
Alpha.	14 1/2	12 1/2	13 1/2	14 1/2
Alta.	19 1/2	15 1/2	17 1/2	24 1/2
Andes.	1 3/5	90 1/2	1 1/2	1 1/2
Baltimore Con.	1 1/2	1 1/2	1 1/2	1 1/2
Belcher.	7 1/2	6 1/2	7 1/2	6 1/2
Belmont.	2 1/2	2 1/2	2 1/2	2 1/2
Best & Belcher.	2 1/2	2 1/2	2 1/2	2 1/2
Bullion.	8 1/2	6 1/2	6 1/2	6 1/2
Oleodina.	2 1/2	2 1/2	2 1/2	2 1/2
California.	2 1/2	2 1/2	2 1/2	2 1/2
Change.	1 1/2	1 1/2	1 1/2	1 1/2
Chollar-Potosi.	4 1/2	4 1/2	4 1/2	4 1/2
Confidence.	7 1/2	6 1/2	6 1/2	6 1/2
Con Imperial.	1 1/2	1 1/2	1 1/2	1 1/2
Con Virginia.	2 1/2	2 1/2	2 1/2	2 1/2
Crown Point.	9 1/2	7 1/2	7 1/2	7 1/2
Coso Con.	5 1/2	5 1/2	5 1/2	5 1/2
Dayton.	7 1/2	6 1/2	6 1/2	6 1/2
Deer Creek.	5 1/2	4 1/2	4 1/2	4 1/2
Edwards & Bertrand.	3 1/2	3 1/2	3 1/2	3 1/2
Gen Thomas.	3 1/2	3 1/2	3 1/2	3 1/2
Grand Prize.	12 1/2	12 1/2	12 1/2	12 1/2
Knickerbocker.	1 1/2	1 1/2	1 1/2	1 1/2
Globe Con.	1 1/2	1 1/2	1 1/2	1 1/2
Golden Chariot.	1 1/2	1 1/2	1 1/2	1 1/2
Gould & Curry.	1 1/2	1 1/2	1 1/2	1 1/2
Hale & Norcross.	3 1/2	2 1/2	2 1/2	2 1/2
Harvey.	3 1/2	2 1/2	2 1/2	2 1/2
Julia.	3 1/2	2 1/2	2 1/2	2 1/2
Justice.	1 1/2	1 1/2	1 1/2	1 1/2
Kentuck.	4 1/2	3 1/2	3 1/2	3 1/2
K K Con.	6 1/2	5 1/2	5 1/2	5 1/2
Knickerbocker.	3 1/2	2 1/2	2 1/2	2 1/2
Kosuth.	3 1/2	2 1/2	2 1/2	2 1/2
Lady Bryan.	1 1/2	1 1/2	1 1/2	1 1/2
Lady Wash.	1 1/2	1 1/2	1 1/2	1 1/2
Leviathan.	6 1/2	5 1/2	5 1/2	5 1/2
Leeds.	2 1/2	2 1/2	2 1/2	2 1/2
Modoc.	5 1/2	5 1/2	5 1/2	5 1/2
Manhattan.	1 1/2	1 1/2	1 1/2	1 1/2
Mansfield.	5 1/2	5 1/2	5 1/2	5 1/2
Meadow Valley.	5 1/2	5 1/2	5 1/2	5 1/2
Mexican.	1 1/2	1 1/2	1 1/2	1 1/2
North Con Virginia.	2 1/2	2 1/2	2 1/2	2 1/2
New York.	2 1/2	2 1/2	2 1/2	2 1/2
Niagara.	1 1/2	1 1/2	1 1/2	1 1/2
Northern Belle.	1 1/2	1 1/2	1 1/2	1 1/2
New Coso.	1 1/2	1 1/2	1 1/2	1 1/2
Oberlin.	5 1/2	4 1/2	4 1/2	4 1/2
Overman.	2 1/2	2 1/2	2 1/2	2 1/2
Phil Sheridan.	5 1/2	4 1/2	4 1/2	4 1/2
Potosi.	5 1/2	4 1/2	4 1/2	4 1/2
Poorman.	5 1/2	4 1/2	4 1/2	4 1/2
Prospect.	8 1/2	8 1/2	8 1/2	8 1/2
Raymond & Ely.	2 1/2	2 1/2	2 1/2	2 1/2
Rock Island.	2 1/2	2 1/2	2 1/2	2 1/2
Sage.	1 1/2	1 1/2	1 1/2	1 1/2
Seg Belcher.	4 1/2	3 1/2	3 1/2	3 1/2
Sierra Nevada.	6 1/2	5 1/2	5 1/2	5 1/2
Silver Hill.	3 1/2	2 1/2	2 1/2	2 1/2
South Chariot.	3 1/2	2 1/2	2 1/2	2 1/2
Superior.	3 1/2	2 1/2	2 1/2	2 1/2
Trojan.	1 1/2	1 1/2	1 1/2	1 1/2
Union Con.	7 1/2	6 1/2	6 1/2	6 1/2
Utah.	1 1/2	1 1/2	1 1/2	1 1/2
Wells Fargo.	3 1/2	2 1/2	2 1/2	2 1/2
Woodville.	3 1/2	2 1/2	2 1/2	2 1/2
Yellow Jacket.	1 1/2	1 1/2	1 1/2	1 1/2

325 Savage.	12 1/2
175 Sierra Nevada.	5 1/2
100 Senator.	3 1/2
225 Solid Silver.	5 1/2
350 St. Louis.	4 1/2
50 Gen Thomas.	2 1/2
600 Trojan.	7 1/2
20 Utah.	1 1/2
810 Union Con.	7 1/2
100 Woodville.	3 1/2
100 Wells Fargo.	3 1/2
300 Yellow Jacket.	1 1/2

SALES OF LAST WEEK AND THIS COMPARED.

Thursday A. M., Dec. 27.	Thursday A. M., Jan. 3.
60 Alpha.	13 1/2
100 Andes.	1 1/2
1200 Alta.	21 1/2
255 American Flat.	1 1/2
155 Best & Belcher.	2 1/2
155 Belcher.	2 1/2
500 Bullion.	5 1/2
610 Benton.	3 1/2
450 Boyle.	5 1/2
400 Caledonia.	4 1/2
230 Chollar.	4 1/2
500 Con Virginia.	2 1/2
100 Chollar.	3 1/2
200 Crown Point.	7 1/2
1420 Con Imperial.	1 1/2
50 Dayton.	5 1/2
350 Excelsior.	4 1/2
350 Gould & Curry.	9 1/2
900 Hale & Norcross.	3 1/2
750 Justice.	1 1/2
150 Julia.	2 1/2
85 Kentuck.	4 1/2
230 Kosuth.	4 1/2
800 Lee.	4 1/2
300 Leviathan.	3 1/2
230 Lady Wash.	1 1/2
550 Mexican.	1 1/2
230 Monument.	2 1/2
2010 New York.	2 1/2
200 North Con Vir.	9 1/2
675 Ophir.	5 1/2
350 Overman.	2 1/2
100 Potosi.	5 1/2
300 Rock Island.	2 1/2
1240 Savage.	11 1/2
130 Sierra Nevada.	5 1/2
800 Silver Hill.	3 1/2
100 St. Louis.	4 1/2
1230 Silver Hill.	2 1/2
100 Senator.	2 1/2
100 Sierra Nevada.	5 1/2
85 Utah.	1 1/2
575 Union Con.	7 1/2
55 Woodville.	3 1/2
200 Ward.	7 1/2
100 Wells Fargo.	3 1/2
650 Yellow Jacket.	1 1/2

Friday A. M., Dec. 28.	Friday A. M., Dec. 28.
190 Alpha.	13 1/2
700 Alta.	22 1/2
885 Andes.	1 1/2
120 Best & Belcher.	10 1/2
600 Belcher.	2 1/2
1400 Bullion.	5 1/2
870 Benton.	3 1/2
100 Boyle.	5 1/2
350 Baltimore Con.	1 1/2
115 Chollar.	4 1/2
720 California.	2 1/2
375 Con Virginia.	2 1/2
180 Crown Point.	7 1/2
3070 Con Imperial.	1 1/2
400 Caledonia.	4 1/2
10 Challenge.	1 1/2
150 Confidence.	5 1/2
100 Dayton.	5 1/2
240 Deers.	4 1/2
310 Excelsior.	4 1/2
420 Gould & Curry.	9 1/2
435 Hale & Norcross.	3 1/2
100 Justice.	1 1/2
210 Julia.	2 1/2
545 Kentuck.	4 1/2
550 Lady Wash.	1 1/2
300 Leviathan.	3 1/2
800 Lee.	4 1/2
850 Mexican.	1 1/2
100 Morning Star.	5 1/2
200 Mint.	2 1/2
100 North Con Vir.	9 1/2
2120 New York.	2 1/2
375 Ophir.	5 1/2
300 Overman.	2 1/2
50 Occidental.	1 1/2
300 Rock Island.	2 1/2
1000 Savage.	12 1/2
220 Sierra Nevada.	5 1/2
1035 Silver Hill.	2 1/2
155 Solid Silver.	5 1/2
100 Senator.	2 1/2
1160 St. Louis.	4 1/2
2145 Trojan.	7 1/2
230 Union Con.	7 1/2
240 Utah.	1 1/2
100 Ward.	7 1/2
240 Woodville.	3 1/2
50 Wells Fargo.	3 1/2
50 Yellow Jacket.	1 1/2

California Board—Latest Sales.

Wednesday A. M., Jan. 2.	Wednesday A. M., Jan. 2.
100 Amazon.	4 1/2
20 Alpha.	1 1/2
40 Alta.	2 1/2
40 Andes.	1 1/2
90 Bullion.	5 1/2
100 Crevice.	5 1/2
50 California.	2 1/2
20 Con Virginia.	2 1/2
40 Excelsior.	4 1/2
200 Globe.	5 1/2
20 Gould & Curry.	9 1/2
50 Hale & Norcross.	3 1/2
60 Mexican.	1 1/2
1300 Monumental.	1 1/2
700 Newark.	2 1/2
1100 North Carson.	10 1/2
20 Ophir.	5 1/2
20 Overman.	2 1/2
50 Rock Island.	2 1/2
40 Silver Hill.	2 1/2
20 St. Louis.	4 1/2
500 Sierra Nevada.	5 1/2
200 Savage.	1 1/2
200 Twin Peaks.	7 1/2
100 Trojan.	7 1/2
600 Wash. Bon.	1 1/2

Pacific Board—Latest Sales.

Wednesday A. M., Jan. 2.	Wednesday A. M., Jan. 2.
120 Andes.	1 1/2
180 Alta.	2 1/2
210 Best & Belcher.	2 1/2
50 Belcher.	2 1/2
1165 Benton.	3 1/2
270 Bullion.	5 1/2
795 Con Imperial.	1 1/2
120 Crown Point.	7 1/2

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S M Co	Washoe	2	2 00	Dec 13	Jan 17	Feb 7	W H Watson	302 Montgomery st
Belcher M Co	Washoe	12	1 00	Dec 17	Jan 13	Feb 7	J Crockett	419 California st
De Fries M & Co	Cal	4	25	Nov 22	Dec 24	Jan 14	T E Atkinson	310 Pine st
Grand Prize West M Co	Cal	1	10	Nov 13	Dec 14	Jan 7	E F Dickins	327 Pine st
Gen Lee S M Co	Arizona	1	5	Dec 3	Jan 5	Jan 23	T E Atkinson	310 Pine st
Gould & Curry M Co	Washoe	32	1 00	Dec 13	Jan 23	Feb 13	A K Durbin	309 Montgomery st
Hale & Norcross M Co	Washoe	37	1 00	Dec 13	Jan 17	Feb 8	J Lightner	309 Montgomery st
Modoc Con M Co	Cal	3	50	Nov 16	Dec 21	Jan 14	E F Dickins	327 Pine st
Pawnee M Co	Cal	1	10	Nov 21	Dec 24	Jan 14	C Allenberg	458 California st
Silver Nevada M Co	Cal	2	10	Nov 16	Dec 28	Jan 14	R H Brown	S F Stock Exchange
Silver Hill M Co	Washoe	1	1 00	Dec 4	Jan 9	Jan 30	W E Dean	419 California st
Trojan M Co	Washoe	6	25	Dec 27	Jan 28	Feb 18	D Wilder	328 Montgomery st
Utah S M Co	Cal	18	2 00	Nov 12	Dec 17	Jan 7	G C Pratt	309 Montgomery st
Ward Con M Co	Cal	2	15	Nov 8	Dec 17	Jan 7	G A Sankey	331 Montgomery st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Argenta M Co	Cal	1	15	Dec 11	Jan 21	Feb 11	R H Brown	327 Pine st
Advance S M Co	Cal	1	50	Nov 21	Jan 2	Jan 26	B Lingley	308 California st
Alameda M Co	Cal	1	10	Dec 8	Jan 23	Feb 25	F R Banker	508 Montgomery st
Bulwer M Co	Cal	1	50	Dec 13	Jan 18	Feb 11	J W Willis	309 Montgomery st
Crown Point Ravine M Co	Cal	1	10	Nov 24	Dec 29	Jan 16	J M Buffington	309 California st
Deer Creek M Co	Cal	8	10	Nov 8	Dec 12	Jan 3	G P Thurston	315 California st
Del Rey M Co	Cal	3	15	Dec 15	Jan 31	March 2	S A Chapin	Merchant's Ex
Edwards Tunnel & M Co	Cal	1	10	Oct 23	Dec 10	Jan 12	J H Paga	312 Pine st
Enterprise Con M Co	Cal	15	15	Nov 10	Dec 22	Jan 12	F J Hermann	612 Commercial st
El Dorado D G Co	Cal	17	1 00	Nov 20	Dec 27	Jan 14	H Elias	624 Sacramento st
Fort Yuma G M Co	Cal	1	1 00	Dec 22	Jan 1	Jan 11	Wm Loge	319 Clay st
Leonard M Co	Cal	1	15	Nov 27	Dec 1	Jan 21	F H Brown	426 California st
Godfrey Cravel M Co	Cal	2	5	Dec 1	Jan 7	Jan 28	J M Buffington	309 California st
Hayward Con M Co	Washoe	2	25	Dec 15	Jan 17	Feb 7	J H Brooks	Pine and Sansome sts
Hartford M Co	Cal	1	2	Nov 30	Jan 3	Jan 3	E F Stone	306 Pine st
Knickerbocker M Co	Cal	1	10	Dec 8	Jan 12	Jan 12	N P Banker	402 Montgomery st
Kentucky Ridge M Co	Cal	1	20	Nov 17	Dec 24	Jan 14	F J Hermann	612 Commercial st
Lucky Jack M Co	Cal	1	5	Dec 6	Jan 12	Feb 5	W Willis	309 Montgomery st
Mexico's Flat Blue Gravel M Co	Cal	5	25	Nov 24	Dec 29	Jan 16	J M Buffington	309 California st
Manzanita G M Co	Cal	1	10	Dec 3	Jan 8	Jan 31	Geo S Spratt	51 Fremont st
Marathon Gravel M Co	Cal	1	10	Dec 3	Jan 8	Jan 31	F E Leary	419 California st
New England G M Co	Cal	2	10	Nov 27	Dec 31	Jan 18	D L Thomas	419 California st
New Basel Con Gravel M Co	Cal	1	7	Nov 10	Dec 28	Jan 14	D F Le Gaye	610 Merchant st
Sunmit M Co	Cal	1	6	Dec 10	Jan 21	Feb 26	J W Clark	418 California st
Sutro M Co	Washoe	3	2	Dec 22	Jan 30	Feb 29	A B Cathcart	327 Pine st
South Overman Con M Co	Washoe	2	25	Dec 28	Jan 28	Feb 18	D Wilder	328 Montgomery st
Timothy Chub M Co	Cal	1	50	Dec 4	Jan 4	Jan 21	G C Pratt	309 Montgomery st
Wall Street Quicksilver M Co	Cal	1	10	Nov 17	Dec 21	Jan 12	D K Tripp	401 California st
Welch Con M Co	Cal	1	10	Dec 5	Jan 7	Jan 26	J P Forbes	420 Montgomery st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Argenta M Co	NeV	R H Brown	327 Pine st	Annual	Jan 14
Bullion M Co	Washoe	J S Kennedy	419 California st	Annual	Jan 10
Con Virginia M Co	Washoe	A W Stevens	309 Montgomery st	Annual	Jan 10
California M Co	Washoe	O P Gordon	309 Montgomery st	Annual	Jan 16
Crown Point Ravine M Co	NeV	J M Buffington	309 California st	Annual	Jan 14
Deer Creek M Co	Cal	F W Utter	409 California st	Annual	Jan 7
Gila S M Co	NeV	W W Parrish	328 Montgomery st	Annual	Jan 14
Knickerbocker Gravel M Co	Cal	F Klosternann	309 California st	Annual	Jan 11
Knickerbocker M Co	NeV	J H Sayre	330 Pine st	Annual	Jan 18
Leviathan M Co	NeV	F E Luyt	507 Montgomery st	Annual	Jan 14
Mariposa Land & M Co	Cal	L Leavitt	309 Montgomery st	Annual	Jan 10
Northern Light G M Co	Cal	F S Mendenhall	419 California st	Annual	Jan 7
Pine M Co	NeV	D D Moore	432 Montgomery st	Annual	Jan 16
Sierra Nevada M Co	Washoe	W W Stetson	309 Montgomery st	Annual	Jan 26

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

LAVA BEDS.—Amador Ledger, Dec. 29: The peculiar deposits known as the Lava beds, on the line of the main mineral belt, about one and a half miles from Drytown, continue to prove immensely rich in gold. The formation consists of a kind of decomposed quartz, which carries a heavy percentage of metal. A party of Mexicans have been plucking along there for many months, keeping very quiet about their success. There are good reasons for believing, however, that the results obtained rival the palmy days of '49. The workings are on a ridge, and the rock is packed in a bag to an arastra, and there crushed. The quantity of gold they are gathering in is astonishing. The last few weeks, it is said, they have panned out \$4,000 or \$10,000. One of the miners there stated to a passer-by that one day last week they cleaned out \$4,000. Within the past week \$3,200 worth of bullion has been sold in Jackson. The ownership of the ground where these results are obtained is in dispute.

MOORE MINE.—We are gratified to learn that everything moves along satisfactorily at this claim. The work of re-tilting the shaft was completed sooner than was anticipated, owing to the fact that below the water mark the timbers were found to be comparatively sound. Putting up hoisting apparatus is now in order. Knight & Co. have contracted for the erection of machinery to be run by water power, capable of sinking the shaft to a depth of 400 feet.

PLYMOUTH.—J. A. Davis' quartz mill will be run by water power from Dry creek, brought through the ditch just repaired by the Phenix company.

The big mine of the American Flat company, at Fiddletown, is two weeks from completion.

AMADOR CITY is overrun with miners seeking employment.

The Original Amador is running 10 stamps. Considerable prospecting is being done in the mine.

CALAVERAS.

SAN ANDREAS GRAVEL CLAIM.—Calaveras Citizen, Dec. 29: This claim, situated about one mile from town, is being vigorously worked. The mine has been entirely drained of water and the new tunnel is now in 60 to 70 feet. The gravel taken from the mine shows gold. At present 10 men are employed in the mine.

RAIS.—Calaveras Chronicle, Dec. 29: The first really heavy rain of the season occurred Saturday and Sunday last. Copious showers fell, and as the weather has been "threatening" all the week, we conclude the storm is not over yet. There has been a heavy fall of snow in the mountains, extending as far down as Alabama hill, near Rich Gulch Flat. For all that, though, there is not half a ditch full of water and our hydraulicists are still "sitting on the ragged edge"—or seat. The cold weather has frozen the sources of water supply and the chances are that it will keep them locked until next season.

WEST POINT MINING.—Champion still sinking. The indications that the mine will continue to pay largely were never better than at present. Excellent ore is being taken from the north level of the Enterprise Con. Rock is accumulating on the new level, but not being any water to run the mill. When the crushing machinery can be started the yield of the mine will be large. The Zactero mine is running and work is progressing in all the claims in the vicinity.

MOSQUITO GULCH ITEMS.—Peter Gass & Co.'s mine has been sold to a San Francisco company, who took possession last week and immediately commenced work on same. Six men are now employed. J. J. Holmes, Superintendent; John V. Brown, formerly of San Bruno, is foreman. Price paid, \$3,000. Banner mine is being energetically worked and rich rock has been struck in sinking. About 20 men are employed. Holmes mine still continues to produce rich rock, and work here is being energetically carried on. Grand Central shaft is down 120 feet. Work is being systematically carried on under the supervision of J. L. Hoey.

EL DORADO.

IRON ORE.—El Dorado Republican, Dec. 27: Some months ago an iron mine was located about three miles southeast from this city. The mine was partially developed some years ago in prospecting for gold and copper. A substance was found that was supposed to be copper, and a quantity was sent to San Francisco to be assayed. The report came back, "80% chrome iron." Not knowing the value of it, the parties engaged upon the mine abandoned it. During the past year the mine has been relocated and negotiations are now pending for its sale to an Eastern company. There can no longer be any doubt about the value of this property, as it has been visited and thoroughly investigated by several parties familiar with iron mines and iron manufacture, and all pronounce it valuable. In addition to the iron upon this property, there is an abundance of limestone and also fine articles of marble and an abundance of wood.

INYO.

ALABAMA DISTRICT.—Inyo Independent, Dec. 29: Jimmy Sharp is still patiently working away at his little gold ledges in Alabama district, some 10 miles south of town. The seams and strata vary from one to eight inches in thickness, but are immensely rich in gold—a peculiarity of Sharp's single-handed quartz mining being that he makes it pay. He works the finest pieces into jewelry sets, crushes out the balance by hand and then manufactures the gold into rings and bangles. We are promised of a beautiful piece of hard, brown quartz, flecked all over with the yellow metal, which came from a small feeder among the number which lead into the main ledge. The latter he calls the Sioux, which stands perpendicular and carries from four to eight inches of fine milling ore. The Hitchcock boys are working an equally valuable ledge in the same immediate vicinity. From all descriptions of the place, we believe that a deep prospect shaft would show up something wonderfully rich if not extensive.

NEVADA.

GOLD HILL MINES.—Grass Valley Union, Dec. 20: The work of development in the Gold Hill mine is making good progress. The lowest level is down 400 feet and drifts are being run both north and south. The north drift is showing a fine quality of ore, with a vein of 15 inches. In this part of the mine they have 250 feet of backs, which will take a long time to exhaust and which it is confidently expected will give better results. The south drift has not been pushed far enough to show much, but the general opinion of the mine is very encouraging. By the pumping out of the mine, Gold Hill has been completely drained, and it has given the holders of adjoining claims on the hill a start, and, in consequence, a good deal of prospecting is going on, which is likely to be attended by rich strikes, as there is much faith in Gold Hill being able to show a bonanza that will rival her early glories, when it was known as the location of the first gold quartz discovered in the State.

THE PLEVNA.—Foothill Tidings, Dec. 27: This is the name of a new mining location, or rather a re-location of the old Redan ground over at the north foot of Osborn hill, made by the Stewart Bros. of Ophir hill, and others. They have taken out some fine rock of late, but are now down to a depth requiring machinery to reach the water out, which they are trying to secure.

A PROMISING MINE is that of Fleming & Bigelow, over on Deer creek. It is said to have turned out a large amount of rock during the past few months, which paid an average of a little over \$50 per ton. They have a fine pay chute and the mine can be worked for a long time above the level of sea level, thus avoiding the necessity for making assists in.

PLACER.

DIVIDE MINING ITEMS.—Placer Herald, Dec. 29: From Mr. A. Wilson, of Forest Hill, who has been visiting Auburn this last week, we learn that at the Centennial mine, near Todd's valley, work is being pushed ahead vigorously and the gravel is paying well.

PORS & CO.'S GRAVEL.—Todd's valley. Have their hydraulic mines all fitted up in fine condition for washing, and are only waiting for rain enough to fill the ditches. They fired off a big blast recently that did excellent execution.

THE BIG SPRING CLAIM near Forest Hill, run by the May boys, is fitted up for hydraulicking, but in the absence of water as yet the parties are drifting away, determined if they can't get gold one way they will have it another.

THE DARDANELLES. In Forest Hill district, have completed their extensive and expensive season's repairs to both mines and ditches, and have considerable ground blasted. With plenty of water, this company will make things lively.

THE GREEN SPRING, east of the Dardanelles, W. Jones, Superintendent, is fitted in good shape for hydraulicking, but like the other hydraulic mines is waiting for water.

THE HOPE CLAIM, run by the Phillips, they are drifting, and it is understood are doing well.

REMARKS is prospecting and fitting up the Baltimore for future operations.

THE JERSEY, a drift claim, owned by a Welsh company, is now doing well. They have been troubled some with bad air in the past, but this difficulty now being overcome, they are in a fair way to make things tight.

HARRY DAVIS & CO., and Grange & Co., both big claim owners at Statish's point, are, owing to the scarcity of water, preparing to work their claims by the drift process.

TRAPION & HOBBS, at Yankee Jim's, are sinking on their newly discovered quartz ledge, the Badger. They propose to prospect the claim thoroughly.

PLUMAS.

STRECKER RICH.—Plumas National, Dec. 27: We hear it reported that a rich strike has been made in Judkins' Newtown claims within the past week, and that Thursday a washing of 12 tubs of dirt yielded \$50. That is about the figures which the old lead gravel used to turn out, and we hope that Jud. has got it this time, and will be able to keep it for the next 10 years.

SACRAMENTO.

THE CHINESE.—Folsom Telegraph, Dec. 27: The Chinese are securing the right to mine in every possible nook and corner in and around Folsom. These mines undoubtedly pay them well, and while they are making money we shall most assuredly have the Mongolian race well represented here.

SIERRA.

SILVER DISCOVERY.—Marysville Appeal, Dec. 29: S. B. Bie, of Dryden, Nev., favored us with a brief call last evening, and informed us that he was en route to Sacramento for the purpose of obtaining an accurate test of silver ore taken from a newly discovered lode about half a mile distant from Downieville. The lode is 40 feet in width on the surface, and it will pay for working from the top. Six thousand feet on the main lode have been located. Mr. Dore has been prospecting for this silver bonanza for six years, and at last is able to exclaim, "Eureka." The discovery of this lode is an extension of the Nevada mines, as it bears the same mineral combinations and characteristics and lies in the same zone.

TULARE.

VARIANTEO MARBLE.—Iron Age, Dec. 27: Mr. Ragan, of this place, is working some fine specimens of variegated marble quarried 20 miles east of this place. They receive a brighter finish than Italian marble, and for many kinds of work are more beautiful as well as durable. But there is one drawback—being harder and more compact, it is more expensive to dress. There are marbles in this country, however, softer than Italian marble, and it is proposed to saw them for the market. These soft marbles have been found, but, though unsuited for statuary, could be made into beautiful car seat covers, marble shelves, etc., than any marble now in use.

TUOLUMNE.

CHIEFA HUNTING.—Union Democrat, Dec. 29: Sunday morning hunting was quite lively with both boys and men who were out chipping water chaps. Several fine specimens, and it was rumored that one chips of four ounces was picked up near the corner of Washington and Main streets, on a pile of tailings.

PREPARING TO MINE.—Quite a number of claims are being put in order in the neighborhood of Sawmill Flat, Yankee Hill and Summit Pass, by the erection of hydraulic pipe, mostly of the Little Giant pattern, using from 200 to 300 inches water each, and with discharge in capacity of nozzle from four to seven inches. The miners are hopeful of a good supply of water, and a large yield of gold. Sunday all the water courses were running more water than they have for months.

FINE SPECIMEN.—Louis Klefeker and Adam Haag have a splendid specimen from their claim in the mountains east of here of an alloy (natural) of gold, silver and lead. It weighs several pounds in weight, and looks as if it had boiled over in some laboratory, and cooled down before it reached the ground. It reminded us of the species of ore common in Pennsylvania, known among the furnace men as pipe ore, from its resemblance to a bunch of clay tobacco-pipe stems.

YUBA.

BIO OAK FLAT GRAVEL CO.—Gold Hill News, Dec. 27: C. F. Klepper, Supt. of the Big Oak Flat M. Co., in Yuba county, California, is over on a Christmas visit to Virginia City, and reports excellent progress with the works, and favorable prospects of a big fortune ahead for the company at no very distant day. The tunnel now being run to drain the water and reach the rich gold-bearing gravel bed is believed to underlie the surface of the company's ground, is now in a distance of 500 feet, and will yet have about 300 feet to run to penetrate the rim rock and reach the pay gravel. This company is composed of some of the best business men of Virginia City. L. P. Drexler, D. O. Adkinson, E. A. Schultz, Mark Strouse and Wm. A. Rung are the Trustees. D. O. Adkinson is President, Mark Strouse is Vice President, E. A. Schultz is Secretary, and L. P. Drexler, Cashier. The capital stock of the company is \$250,000, divided into 2,500 shares of \$100 each.

Nevada.

WASHOE DISTRICT.

CON VIRGINIA.—Gold Hill News, Jan. 2: Daily yield, 550 tons of ore. The ore stops in the 1550, 1550, 1400 and 1300-ft levels are all yielding their usual quantities of rich ore. Day before yesterday a shipment of 16,688 pounds of bullion, worth \$540,156, was made, being the proceeds of eight days' run of the mills. The mine was never in better working condition or had more favorable prospects than at this time. Work is being pushed forward with steady vigor at every point. On the 1550-ft level the ore stops going south continue to yield rich ore. On the 1750-ft level east crosscut No. 3 has passed through the small vein of rich ore recently found, and drifts both north and south have been started to prospect this vein. The bullion yield is already amply sufficient to insure the payment of the usual monthly dividend of \$2 per share.

CALIFORNIA.—Daily yield, 650 tons of ore. The mills are all running, and turning out the usual amount of bullion. Day before yesterday a shipment of 16,120 pounds of bullion, worth \$558,903, was made, being the largest shipment of bullion ever made at one time from the mine. The ore stops on the 1550, 1550, 1000 and 1650-ft levels all continue their regular yield of rich ores. The yield of bullion already assures the payment of the regular monthly dividend of \$2 per share for the month of December. Everything in connection with the mine is working splendidly, both above and below ground, and there seems as yet nothing but bright prosperity ahead.

SILVER HILL.—Sinking the main incline is being pushed quite rapidly forward. The east drift on the 800-ft level continues in clay, quartz and porphyry mixed, and of a

very lively, ore-bearing look. The flow of water from this drift is considerable, the drift having without doubt drawn the water from the 650-ft level, it having disappeared entirely from that portion of the mine. The development of the mine has never been advanced more vigorously than at this time; if there is a bonanza in that portion of the lode, the present management are going to find it.

MEXICAN.—Sinking the joint Ophir winze below the 1700-ft level is being pushed vigorously ahead to connect with the north drift on the 1000-ft level of the Ophir for air purposes. The winze has 15 or 20 feet yet to go to reach the 1000-ft level.

HALE & NONCROSS.—Owing to the breakage of the Savage pump-hob, nothing has or could be done below the 2000-ft level during the week, the pumps being kept busy to hold the water below that point.

CON. IMPERIAL.—Sinking the joint Alpha winze below the 2135-ft level is making the best of progress. It is now down 160 feet. The south drift from the station at the bottom of the winze on the 2100-ft level is in 24 feet, the face in good working ground.

OVERMAN.—Sinking the deep winze below the 1400-ft level is going vigorously ahead, the bottom in very favorable ground. The south drift on the 1400-ft level is also making good progress, the face in fine quartz.

TRIGAN.—Daily yield, 50 tons, from the slopes and breasts of 350 and 240-ft levels, keeping the Vivian mill steadily running. The ore is not of high grade, but there is plenty of it, and when the indebtedness of the company is paid by the present assessment, the mine will pay its own way.

OMIK.—The completion of the pump and balance bob at the 1900-ft station is being pushed with all the force that can be brought to bear and will be completed in a very short time. The timbers and other machinery are nearly all ready for insertion. The south drift, running east of the main incline on the 1800-ft level, is still advancing, the face in porphyry. This drift is now in a distance of 178 feet. Preparations are being made to sink a winze in the east crosscut from the main shaft, a short distance east of the ore vein. The north drift on the 1800-ft level has reached the Mexican line and a drift has been started west to meet and connect with the joint Mexican winze from the 1700-ft level.

ALFA.—Sinking the main shaft is being pushed vigorously forward to read and open up the 1250-ft level. In the meantime the west drift on the 1150-ft level is being rapidly advanced to cut the ore vein. Sinking the winze in the ore vein below the 1050-ft level has been resumed and is being pushed forward with all possible speed.

JUSTICE.—Sinking the main incline is making best of progress, the bottom in good blasting rock. The shaft will soon have attained a depth sufficient to open another shaft, and will be down at the depth of 1,300 feet. The new ore stops being opened on the 1150-ft level, are showing finely and promise a good yield of pay ore. The Pacific mill will be started up on ore from the mine in a very short time.

SOLID SILVER.—Work was resumed in this mine about a week ago, with Mr. R. Purdy as Superintendent. The main tunnel is being cleared out and retimbered, preparatory to crosscutting at a point where a considerable amount of pay ore exists and which will be stoped out for milling.

BULLION.—Sinking the main incline shaft is going vigorously ahead, the bottom in black dyke of a rather hard, tough character. The distance made during the week was 21 feet. Sinking the winze below the 1340-ft level is making fair progress. A crosscut east has been started on the 2000-ft level, on the south line, between the Bullion and Eschquer ground.

BEST & BELCHER.—Sinking the winze below the 1700-ft level is being pushed vigorously forward to make a connection with the north drift from the 1900-ft level of the Gould & Curry.

YELLOW JACKET.—On the 2200-ft level the east drift toward the new shaft is in 671 feet. The face continues in very hard porphyry, with seams of quartz. The north drift toward the Imperial, at the same level, is in 490 feet, with the face in black dyke. The new shaft is down 1,105 feet. The bottom continues in heavy ground.

JULIA CON.—Sinking the main incline below the 1800-ft level is making good headway, the bottom being very nearly all in lively vein matter. The face of the east drift from the winze on the 1300-ft level is steadily advancing, almost the entire face being in quartz of a fine character.

GOULD & CURRY.—Sinking the main incline is going steadily forward. The west drift on the 1900-ft level running toward the Imperial is being pushed vigorously ahead, and the two will be able to connect in 10 to 12 days more. The repairs to the main shaft above the seventh station are making steady progress.

BELCHER.—The south drift on the 1900-ft level is steadily advancing, the face in favorable ground. The west drift on the same level is also making good progress. The east drift on the 2000-ft level is now in 245 feet.

ALFA.—Sinking the main shaft is going steadily forward, the bottom in fine working ground, and the flow of water giving little or no trouble. The east drift on the 1300-ft level is showing a steady and favorable improvement.

SIERRA NEVADA.—Sinking the deep winze below the 1700-ft level is making excellent progress. Sinking the north winze below the 1250-ft level on the Utah line is also going rapidly forward with encouraging prospects.

SAVAGE.—The water is being held well under control by use of the balling tanks, while every effort is being put forth by the management to get the new V bob in place and ready for use at the very earliest day possible.

UTAH.—The north drift on the 1350-ft level is steadily advancing, the face in vein formation. The south drift on the same level is showing a much softer and more favorable ledge formation. The rock in the face of the north drift on the 1150-ft level continues very hard.

NEW YORK.—Bottom of shaft in good sinking ground, with no increase of water. The shaft is now down about 90 feet below the 800-ft level.

LEVIATHAN.—Good work is being done sinking the incline below the 600-ft level, the ground working favorably and no water interfering. The cable attachment having been completed, the hoisting from the incline is now being done by the main hoisting engine of the surface works.

SOUTH CONCORD.—The face of the main drift east on the 500-ft level is now in soft, fine-grained vein matter, having passed through the hard wall strata into the outcrops of the ore vein.

LADY WASHINGTON.—The main drift south on the 850-ft level continues steadily advancing in low-grade ore toward the Justice mine.

BALTIMORE AND AMERICAN FLAT.—The north drift on the 1400-ft level has been advanced 28 feet during the past week, the face being still in quartz, carrying streaks of ore.

CROWN POINT.—Daily yield, 50 tons of ore, from the old upper levels. The south drift on the 300-ft level is making good progress. The prospecting operations on the 2000-ft level are steadily advancing, without any material change to record.

GEORGETOWN.—The north drift on the 1000-ft level is steadily advancing, the face in very favorable ground. The crosscuts on this level are also showing finely. No changes in either of the drifts on the 1400-ft level.

SUCOR.—The bottom of the shaft is now in vein matter of a highly promising character, being mostly low-grade ore, with occasional streaks that give high assays. The drift at the 900-ft level is also advancing in very favorable indications.

CHOLLAS-POTOSI.—The east drift on the 1735-ft level is steadily advancing and will complete a connection with the west drift from the combination shaft in a very short time. Sinking the combination shaft is going vigorously ahead.

UNION CON.—The north drift on the 1600-ft level is being urged rapidly forward to connect with the Sierra Nevada for air purposes. The connection will probably be completed in 10 days more.

SITRO TUNNEL.—Face of beader in favorable working material, allowing of a good degree of steady advancement. Total length of tunnel, 13,642 feet.

WHITE LEAD.—The face of the tunnel is in material which shows strong indications of the ledge not being far away.

LADY BRYAN.—Preparations being made for the resumption of work on the mine.

BRISTOL DISTRICT.

DAY MINE.—Pioche Record, Dec. 29: Ore continues to be shipped from this mine as rapidly as teams can be had to haul it. The 30-stamp mill started up on Thursday morning, crushing the ore from this mine, of which about 200 tons have already at the mill. A rich body of ore has been struck in the cut running south from the lode, and the mine is now making a splendid showing in regard to ore. The recent work has developed a well defined north and south vein, which has been opened up for a length of 55 feet, both ends being in exceedingly rich ore.

CORNUCOPIA DISTRICT.

MINISO OUTLOOK.—Silver Star, Dec. 29: A correspondent writes that several merchants have sold out or removed their goods to Tuscarora. A vein of good ore, three feet thick, has been developed in the Hussey. The Leopard is being opened on the 600-ft level, and the prospects of striking a good vein are said to be favorable. Water has entered somewhat, but with the development of the mine, but that is now under control. There is said to be enough ore in sight in the Leopard and Hussey to run a 20-stamp mill for two years, at a profit to the companies. The Panther is also looking well and is considered as good as either of the mines mentioned. Some new mines have been discovered in this vicinity recently, but nothing as yet known relative to their value.

ELY DISTRICT.

RAY STATE.—Pioche Record, Dec. 29: Have the house up and have now commenced to straighten up the shaft preparatory to putting on a whim. The work will be pushed ahead as fast as possible.

The shaft is started, and the shaft having been finished, have men to work placing the whim in position, so as to prepare for sinking deeper and hoisting ore.

MAYFLOWER.—The road to the mine being nearly completed, double shifts will be placed to work running the north drifts and sinking through the ledge at right angles for a foot-wall; are hoisting ore and getting the ore-trams ready to transport ore to the 20-stamp mill as soon as repairs to it are completed.

MINERAL HILL DISTRICT.

PROSPEROUS.—Eureka Sentinel, Dec. 29: We yesterday met Mr. Jonathan Walker, of Mineral Hill, who is at present sojourning in Eureka. The Hill is very prosperous, and everybody is busy at work, all with fair success. Those laboring on leased ground are taking out considerable quantities of ore. Capt. Plummer is vigorously prospecting the English company's mine, and has a force of 15 men at work. Indications of the near presence of an ore body have been met with in the Queen's tunnel, and crosscutting will be commenced in a few days. The mill will not be started up until there is sufficient custom and company ore on hand to justify it. Capt. Plummer's management is highly commended, and everybody residing at the Hill is pleased with his administration.

Arizona.

CASTLE DOME.—Arizona Sentinel, Dec. 29: Castle Dome still stands to the front. A number of mining interests up there have been consolidated and taken in hand by the Castle Dome smelting and mining company, a strong corporation, having headquarters in San Francisco. Their works will be on the bay. The difficulty of buying silver ores down here for working with the rich lead ores of Castle Dome, makes it more profitable to smelt at San Francisco. This was always advocated by Wm. F. Miller, and should have been done years ago.

The Moreno mining company gives a fair example of what is yet to be done with mines in Yuma county, which have for years been passed by, probably because they were too accessible and not invested with the fascination of danger from hostile Indians. This company was incorporated October 8th, 1877, having for Directors, W. B. Bie, of Sacramento; Capt. D. Linderman, of Alameda; H. Rosenkrans and R. B. Saffold, of San Francisco; and D. S. Lusk, of Sacramento, now Superintendent. They went to work on a mine over which passes the stage road to Prescott, and which few experts have seen fit to examine. It was too near home and too safe. The surface shows 70 different veins of mineral, carrying gold, silver and lead, all pitching toward the center vein. They run down the hill, some 50 feet high, and crop for the entire length of the claim—1,500 feet. The mine is let for sinking a shaft 100 feet deep. At fifty feet they already have two feet of ore, assaying from hundreds to thousands. Several of the smaller veins are coming in and the mine bears every indication of producing one of the richest ore bodies yet reported in Arizona. None of the men connected with the Moreno company are known as mining sharks or stock thieves. So far everything seems to indicate that the property will be worked honestly and for the best interest of stockholders. The mine itself is most advantageously situated on the main traveled road, about 40 miles from the Colorado river, at Ehrenberg.

CALIFORNIA.—Arizona Enterprise, Dec. 22: Mr. T. M. Luther, who has men at work on the California lode, in Bradshaw mountain, arrived in Prescott a day or two ago. At the time he left the mine, the shaft was down about 60 feet. Said shaft is six feet by four in the clear and the vein has more than filled the shaft. The miners are timbering as they go.

The same gentleman informs us that the Tiger mine, under Mr. Helm's management, is undergoing thorough prospecting. More men have been added to the old working force.

CRICK.—Late news from Humboldt district is of a very satisfactory nature. The Tip-Toe, Coy. Swilling and other mining properties continue to astonish all who see the great quantities of high-grade silver ores that are daily taken out of them. The same may be said of the Peck and sister mines in Peck district.

LOCATER.—N. Rodenburg, of this place, tells us that Henry Muller has just found and located what promises to be a very rich mine, in Humboldt district. Assays of the ore, made by Messrs. Blake & Co., of Prescott, prove it to be rich.

ZALIDA.—Arizona Miner, Dec. 21: The Zalida company has just had 10 tons of ore worked at the Aztlan mill, which yielded 3,300 ounces of crude bullion. The Zalida, we believe, works pretty high in gold as well as silver. We shall try to get the value for publication when it is melted and assayed.

CRICK.—Mr. Wylos has returned from a trip to the Bradshaw mountains and Tiger mining district. Mr. Helm will start for San Francisco about the 1st of January. He has offered \$50 per foot for 100 feet on the north end of the Hammond & Riggs' claim and \$50 per foot for the 200 feet adjoining the original Tiger, known as the Colyer claim.

PECK.—The last of the Peck company's machinery arrived to-day, and will be immediately sent out to the new mill, which, Mr. Bean informs us, will be crushing quartz by New Year's day.

Idaho.

BELLE PECK.—Owyhee Avalanche, Dec. 24: Rumors have been prevailing for the past day or two to the effect that another rich strike has been made in the Belle Peck. All persons interested in mining operations in this vicinity are fervently praying for a big fall of snow. It is neither good sleighing nor good wheeling, in consequence of which there are large quantities of rock at many mines awaiting transportation to the mills.

The Illinois Central is turning out some good ore, a portion of which will be crushed at the Shoemaker arastra in a few days.

Operations at the Golden Chariot are progressing very favorably, and Supt. Denoon entertains strong hopes, as usual, of the existence of a big bonanza in the lower level.

There is no change in the status of the Empire, but as—

Continued on page 12.

The Yellow Jacket New Shaft.

Description of the Shaft and Machinery.

The new shaft of the Yellow Jacket mining company is situated far to the eastward of all other Gold Hill mining works. It is nearly a mile east of the old shaft and works of the company, in the town of Gold Hill, from which it is hidden by several high and rocky hills. The site of the shaft, says the *Virginia Enterprise*, was most carefully and judiciously selected. It is located a sufficient distance to the eastward to bring it in a line with the advanced underground works of the Chollar-Potosi, Hale & Norcross, Savage, Gould & Curry and the Bonanza mines. The shaft is being sunk on a short spur putting out to the eastward from the main range of hills running southward from this city. To the eastward of this spur is a broad and deep gorge, and both north and south are deep ravines, which will furnish dumping room for waste rock for ages. The shaft and works are but a few rods south of the line of the Virginia and Truckee railroad, from which a side track leads to car tracks running to the buildings. Thus it will be seen there is no teaming to be done. Everything required about the works in the way of machinery, stone, timber, lumber and supplies is brought upon the ground by rail.

The Buildings

Over the shaft are large and most substantially constructed of stone and wood. The main building, in which are the hoisting engines and shaft, is 41½ feet in width by 141 feet in length. From the floor, on which stand the hoisting engines and apparatus to the square of the roof, the height is 44 feet. In the large room there is abundant space for all the machinery without the least crowding in any part. The whole interior, beams, roof-timbers, roof and all, have been whitewashed, rendering the room as light as could be desired; indeed, almost as light as out of doors. Underneath this large room is a basement, the walls of which are built of cut stone. In this is also a vast deal of room for machinery and for working purposes. From the floor of the basement to the peak of the roof of the main building the height is 80 feet. From the roof of the main building itself, which is ascended by easy flights of stairs leading up from the outside, a fine view of the surrounding country is obtained. The dump of the Eureka mill, near the railroad track on the Carson river, is plainly to be seen; also the Santiago mill and other places in that direction.

The Boiler Room

Is 52x88 feet in size, and stands on the north side of the main building. In this room there are now three sets of boilers, and two additional sets will be put in when the big pumping engine has been set up. The room is well arranged, and there is ample space in front of the boilers for piling wood and for doing any work necessary to be done by the firemen. A track for a wood car runs from the railroad track to the roof of the boiler room, where it is run upon a cage or elevator and lowered a distance of 35 feet to the floor of the boiler room. It is then run off the cage to a track on the boiler room floor, when it is taken to where wood is wanted and is then unloaded.

The Pumping Room

Is situated to the east of the boiler room, and north of the east end of the main building. It is 53x96 feet in size, and is of about the same height as the main building, with which it forms an L. This room is at present the scene of great activity. The vast foundations for the pumping engine and pumping apparatus are being put in, and the place swarms with stone cutters, stone masons and workmen of all kinds.

The stone used is a feldspathic porphyry, obtained at Nolan's quarry, to the northward of this city. It is very solid and of an exceeding tough nature. More cut stone is being put into the foundations of these works than has ever before been used in any work of the kind on the Comstock lode. Some of the blocks laid and to be laid in the foundations are of immense size and weight. In all, there will be used in this work between 3,000 and 3,500 perches of stone.

It is necessary that the stone should be cut and snugly fitted, as the height of the foundation will be about 35 feet. To bind the whole firmly together and guard against any jar or vibration, a great number of iron rods, of some four inches in diameter, extend upward from the bottom of the foundations, and are built in with the masonry. Holes will be drilled in the cap stones through which these rods will pass, when they will be firmly secured with huge nuts and washers.

The work of constructing the foundations for the pumping engine and pump bob is being most vigorously prosecuted and is fast advancing to completion. There are engaged in the room in which the foundations are being laid, and on the grounds outside of the buildings, some 90 stone-cutters and helpers. So many stone-cutters are at work that the click of their hammers and chisels is almost deafening. The stone work is being done by Daniel Nolan, owner of the quarry at which the stone are procured. Many of the larger blocks are cut at the quarry.

The stone is handled by steam. A donkey engine, the one formerly used in sinking the shaft, which stands in the basement of the main building, brings all the stone into the wing in which the mason work is being done, moves them through the length of the building

on a car, and finally lowers them down upon the exact spot where they are to be used. This saves the workmen a vast deal of hard lifting.

Drilling the Cap Stones.

In a small building standing near the railroad track workmen are engaged in drilling holes through the large blocks of stone which are to top out the foundation walls and found the bed on which will rest the huge plates of the pumping engine and pumping apparatus. The holes, which are four inches in diameter, are bored with a diamond drill which is driven by a small steam engine. The drill penetrates the rock quite rapidly, and the hole is made much smoother and better than could be made by hand. The drill does not cut away the whole of the stone extracted, but brings out a core nearly two inches in diameter. Thus it will be seen that the face of the drill resembles that of a hollow auger. The stem of the drill is hollow, and when it is running a stream of water under a considerable pressure constantly passes down into the rock where the work is being done, bringing up and washing out the chips cut out by the diamonds. This work is progressing well, and all the blocks of stone will be bored by the time the foundations are ready to receive them.

The Shaft

Is one of the finest on the lode. The pump compartment is seven feet six inches by six feet six inches in size, being the largest on the lode. A cage is now running in this part of the shaft, and it will be kept in and kept running, when required, even after the pumping machinery goes into operation, there being plenty of room for it. The hoisting compartments are each five feet by six feet six inches in size. They are most substantially timbered throughout, and the whole shaft is in perfect order.

The shaft had yesterday attained a depth of 1,074 feet. It is now in ground that is somewhat heavy, but which works well, and sinking progresses at the rate of about four feet per day. Very little water is found; in all not more than from 5,000 to 6,000 gallons per day coming into the shaft. Nearly all of this comes up in the "skip," or "skuet," with the dirt.

The "skip" is a sort of heavy iron tank or bucket, square in form, and holding four tons of rock. It is self-dumping, and on reaching the surface turns over so smoothly and neatly that were it filled to the brim with water hardly a drop would be spilled. Having dumped its load, it rights itself and descends the shaft for another load, without being touched by any one. The engineer merely hoists and lowers, as he would do with an ordinary cage. The "skip" is just the thing for use in sinking. It brings up a great load of dirt, and at the same time, with equal safety, will bring up any water that may be in the shaft. The "skip" is a contrivance first used in the Combination shaft in this city, to the eastward of the Savage, Hale & Norcross and Chollar-Potosi mines.

The new Yellow Jacket shaft has been put down very rapidly. The donkey engine was first started up on it November 17th, 1876. With it the shaft was sunk to the depth of 900 feet. The new hoisting machinery, that is now in use, was started up October 10th, 1877. The work of erecting the main building and all the wings, additions and detached buildings, has been done within less than a year.

The Hoisting Engine

At present in use is most compact and powerful. It is of peculiar construction, there being nothing like it anywhere else on the lode, and is well calculated for the work it is now doing. It is sufficiently powerful to sink to the depth of 2,500 feet, but eventually it is expected that it will give way to machinery of still greater capacity. This hoisting apparatus has two steam cylinders 18 inches in diameter by 24-inch stroke. The engine shaft is eight inches in diameter, with a 25-inch pinion. The pitch of the pinion is three and a half inches by 18-inch face. This hoist can be double geared with a pinion 25 inches in diameter on the engine shaft working into a wheel 80 inches in diameter on a 10-inch intermediate shaft; and on the same shaft is a pinion 34 inches in diameter working into a spur wheel 165 inches in diameter. The change of gear is effected by sliding the intermediate shaft in and out by means of a screw and hand wheel on the outer end of the shaft. The object of this gear is for raising pumps and other heavy weights. This is a new arrangement altogether, as a separate engine is generally used for the purpose, and the means adopted in this instance answer for both. The reel shafts are 9 and 12 inches in diameter, respectively, for the reels, of which there are two, 40 inches in diameter by 5-inch face. They can be worked together or separately, with suitable clutches. Each of the spur wheels is furnished with a powerful brake 15 inches in diameter by 6½-inch face, worked by suitable levers connected with a hand-wheel gear.

There is also a brake on each of the engine cranks—another improvement insuring greater safety. These cranks are made six feet in diameter, and are very heavy, forming balance wheels for the engine. Each reel is furnished with the latest improved indicators for telling the depth. The one used is the best one yet devised. On the dial-plate is a spiral thread in which the needle or pointer works, and instead of this pointer having to indicate the depth by one revolution, the use of the spiral gives it three revolutions, thus insuring greater accuracy. In a deep mine where a great deal of cable is out the old way is not accurate enough, but as the depths are plainly

marked on the spiral thread, space enough is given for accurate indicating. The indicators are worked by suitable worm and screw wheels from the reel-shaft. This machinery is all very heavy and finely finished. All the bearings are bushed with brass and fitted with tightening wedges. Each engine is furnished with link-motion reversing gear, patent balance slide valves, etc. The whole apparatus weighs about 90 tons.

The Pumping Engine

Has not yet arrived, though some portions of the machinery connected with it are on the ground. It will probably be completed and on the ground in 30 to 40 days. It will be set up and ready to go into operation within about 60 days after it reaches the works.

It will be a steam jacketed compound condensing engine with two cylinders. The initial cylinder will be 32 inches in diameter, and the condensing cylinders will be 64 inches in diameter with 12-foot stroke each. The cylinders will be placed side by side and the pistons of both will be connected with the same cross-head. The ends of the cross-head will extend beyond the slides on each side, where they will be attached by two connecting rods to two fly-wheels 30 feet in diameter, and weighing 36 tons each.

Owing to the connections between the fly-wheels and cross-head, the pistons will always make their full stroke of 12 feet, and the pumps will therefore never fall short of their full stroke, as they often do with most of the engines now in use along the lode.

The Pump Bob

Will be an immense affair, and will be geared directly to the engine. Except the chord and king post, it will be entirely of wrought and cast iron. The stick of timber for the chord is the largest ever brought to the Comstock or to San Francisco. It came from Oregon, is 38x43 inches square, is 42 feet long, and weighs about 12 tons, as it lies and without irons. The king post is a beautiful stick of timber of proportionate size. The annual rings or growths of the chord stick show it to have been cut from a tree 253 years old.

The rocker shaft of the pump bob is 18 inches in diameter in the bearings. The bearings are solid blocks of brass. From the center of the rocker shaft to the top of the king post, where the attachment with the engine is made, is 21 feet, and the nose end of the bob to the same point it is 17 feet 6 inches, which will give the pump 10 feet of stroke.

The condenser and air pump will be worked with a rocker shaft from the main cross-head. This cross-head will be a huge piece of iron some three feet in diameter.

The pump column will have an inside diameter of 14 inches, and the pump rod will be 16x16 inches, and each stick will be 60 feet in length. Taken all in all this will be the most complete and powerful pumping machinery ever seen on the Comstock lode. It is expected that it will be set up and ready to go into operation by the time there is any work for it to do.

Various Matters.

Thus far the shaft may be said to be dry, as the water coming in amounts to nothing, and is nearly all hoisted out with the dirt. Not only is the shaft dry, but the drift coming toward it, at the great depth of 2,300 feet, is also dry. This drift is now distant from the shaft but 250 feet. In eight weeks more it will be under the shaft.

This being the case, and no water yet being found, it is not likely that the heavy pumping machinery will be required until the shaft shall have attained a depth considerably exceeding 2,300 feet.

No drifting will be done and no station opened until the shaft has reached the depth of 2,300 feet—until it has been connected with the drift. Once the drift has reached a point under the shaft, work on the latter can be commenced most advantageously, as upraise excavation is always much more expeditiously performed than that which is done by sinking.

The gallow's frame is one of the heaviest and most substantial on the lode. It is an immense mass of huge square timbers strongly framed and bolted together. It is also of great height, and when it shall become necessary to put in more powerful hoisting machinery it can be set up in a building placed at the west end of the main building where the hoisting cables will pass high above all the machinery now in operation.

At the top of the main building, on a heavy platform of timbers, are two great iron pulleys, for use in lowering the pumps and pumping machinery into the shaft. The larger of these wheels weighs 9,500 pounds. The smaller wheel, though lighter than its mate, is built to sustain a much greater weight. The blocks and tackle to be used in connection with these pulleys are proportionately strong and heavy.

A large water tank on a high hill to the westward of the works affords ample protection against fire. There are several hydrants in and about the works, with easy flights of steps leading from the ground to tops and over the roofs of the several buildings, but in addition, Superintendent Taylor contemplates the erection of a hydrant on the roof of the main building.

Besides the buildings and wings already mentioned, there is a commodious carpenter shop, blacksmith shop, and all the various shops and outbuildings usually found about works of the kind.

A short distance to the north of the works, just across the railroad track, quite a little vil-

lage is springing up. It already contains ten neat and substantial dwellings.

In conclusion, we may say that the new shaft of the Yellow Jacket company is most favorably situated, it being in the true course of the Comstock, as shown by the deep workings to the eastward in the Savage, Hale & Norcross, Gould & Curry and other mines lying immediately to the northward. The surface indications are excellent. The shaft is being sunk in vein matter, and at a short distance to the eastward, across a gorge, rises a huge mountain of the same material, so strongly marked in color that it may be distinguished at the distance of 15 or 20 miles—as far as the eye can see, for that matter. The Yellow Jacket, in this, its new departure, will presently give a good account of itself, and to see it one need not live long.

Agricultural Investigations at the University.

We have been interested and gratified by the perusal of a pamphlet recently issued from the State printing office at Sacramento, and which contains the reports made to the President of the University from the Colleges of Agriculture and the Mechanic Arts. The chief portion of the pamphlet is occupied with Prof. Hilgard's report, and gives at length the views of this able and indefatigable worker concerning the best methods of promoting the interests committed to his charge. We do not propose at this time to follow the Professor in his well fortified argument on the needs and practical value of a fuller and systematic knowledge of the conditions affecting the practice of agriculture in this State and a better understanding of the capabilities of our soils, or of the advantage it would be to the State to strengthen his hands by securing the aid of specialists in carrying on the work, which is evidently too great for one man to prosecute. These things are important, and will, ultimately, be secured; nor do we underrate them by giving them but an allusion in this place. We wish rather, with the space now at command, to indicate briefly some of the items of the actual work which has been accomplished in Prof. Hilgard's department, as shown by the copious appendices in his report.

Results are given of two years' careful experiments with different cultures of the "hill adobe," which comprises the experimental plat at the University. These results are carefully tabulated, and occupy about ten pages of the report. Although the experiments were considerably interfered with by the excessive drouth of last season, Professor Hilgard discerns results which would lead to the following conclusions concerning the improvement of the upland adobe of the Coast range, which has been weakened by years of cropping. The use of potash manure and of plaster seems to have exerted no influence whatever upon the product either as to straw or grain. The effect of ammoniacal manure is doubtful, and such manures do not seem likely to pay in view of their high cost. The beneficial influence of large dressings of lime seems hardly questionable. It is well known that dressings of lime counteract the tendency to growth of straw, and favor the yield of grain. The culture experiments at the University indicate that the use of 600 to 1,000 pounds of lime per acre will doubtless be followed by a material improvement in productiveness, and doubtless in tillability. There were also results showing that the application of phosphates (whether as superphosphate or bone meal) increased the product.

Prof. Hilgard makes this farther reference to the use of lime on black adobe soils: "The fact that black adobe soil contains over one per cent. of lime, (which is four times the amount usually deemed sufficient for the adequate supply of plant food in good soils), of course shows that the addition of any small amount of lime, as manure, would be useless, but it is nevertheless true that the tillability of the soil may be greatly improved by such addition of lime as can be afforded, in cultivation on a small scale, as in truck gardens, orchards, flower gardens, lawns, etc."

In the important problem of rendering alkali soils productive, Prof. Hilgard's report shows that he has begun investigations which we hope will be continued until the varied nature of our alkali lands may be met with proper remedies. Those interested in these soils should by all means read the full statements and analyses which are given in the report, and aid the Professor farther by sending specimens of their "alkali" soils, according to the instructions given. Prof. Hilgard has already demonstrated his title to honor as a successful doctor for alkali, for in one of the southern counties, where he prescribed gypsum (plaster) for the particular form of alkali presented to him, the farmers applied the remedy with gratifying success, and have recently found a bed of gypsum near at hand with which they can conquer these infertile spaces. It is a victory for science and practice combined which we rejoice to record.

Under the head of analysis of commercial manures, the report gives an analysis of "Ward's Superphosphate," which was brought in this market for examination. It was sold at the rate of \$50 per ton. The caution to farmers against this material is plain in the following quotation from the report: "The ap-
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shows that this is one of the many low grade superphosphate manures, which, in the absence of State supervision of this very tricky class of merchandise, still allows a place in the general market. That it should be thought feasible as a business transaction, to ship such an article to the other side of the continent from the point where it was compounded, shows the unbounded confidence of the manufacturer in the helplessness of the prospective consumers. The valuation (\$33.10 per ton), which is shown by the analysis, low as it is as compared with the price asked, is still too high, because some of the articles credited in the analysis are of no value at all to the farmer. In fact, \$25 per ton would be a high price to pay for the article."

Prof. Hilgard also gives an account of the manufacture of phosphate manures as practiced by Messrs. Ohlandt & Co., Petrolero, S. F. The material obtained at this establishment was found of excellent quality and strictly pure. So small is the appreciation of phosphate manures on this coast, that the above firm ship their products mainly to Australia and New Zealand. On this movement of fertilizing material away from our fields, the Professor says: "It can hardly be questioned that the hauling of common stable manure from the city stables to the truck gardens outside of the city, very frequently renders that manure much more expensive than would be an amount of high grade superphosphate producing a similar commercial result. It cannot be long before this will be understood, and the shipping of our phosphates to Australia replaced by sales in the home market. I cannot help thinking that if a first-class fertilizer of this kind, sold by assay of actual value as are other products, were to be had in the San Francisco market, it would soon come into use, and that a most profitable industry would be thus speedily created. Wherever crops producing a high value per acre (such as the fruits of California), are prominent in culture, the production of the use of concentrated commercial fertilizers to increase and improve the products, cannot be long delayed."

Other items in the appendix to the report relate to analyses of sugar beets and other articles which have been already summarized in Prof. Hilgard's communications to the *RURAL PRESS*. His report is, as we have said, a State document, and should be read by all farmers. Copies will be sent, we presume, to all who may request them from their representatives in the Legislature at Sacramento.

Drying Slimes and Tailings.

The new tailing dryer, which, says the *News*, is being constructed at the Gold Hill foundry, for the Railroad mill, in Six-Mile canyon, consists of three revolving cylinders, arranged parallel with each other in a furnace, so constructed as to secure the greatest available heating surface.

Through the center of each cylinder a shaft containing spiral arms is made to revolve in the same direction as the shaft of the cylinder. The arms, being set spirally, act very similarly to the screw in a conveyor, so that any material put in at one end of the cylinder will be conveyed through to the other end at a velocity proportionate to the pitch of the arms and number of revolutions.

The cylinder will run from left to right at the rate of about 10 revolutions per minute, the arms or blades running about 40 revolutions per minute. By revolving the cylinder a uniform heat is maintained over its entire surface. The cylinders are three feet in diameter and about five and a half feet in length. It is estimated from experiments already made that about 50 tons of wet slimes can be passed through each of the cylinders and thoroughly dried every 24 hours.

Mr. Kimble, the inventor, a practical mechanic, has given his attention for several years to the drying business, and in the East to drying grain and preventing its heating in large elevators.

OLIVE OIL IN SPAIN.—The British Vice Consul at Malaga gives the following reason why Spanish olive oil ranks low in the market: Very large tracts are dedicated to the cultivation of the olive tree. Its produce is a source of material wealth to Spain, and constitutes one of her principal exports. This item alone, however, serves to demonstrate the degree of indifference and short sightedness of the Spanish cultivator. Whilst the oil which his trees yield, when properly treated, bears advantageous comparison with the best Lucera or Florence oils, he is contented to see it quoted in foreign markets at the bottom of the list, and at the lowest rates, condemned and sneered at as green and rank; whilst a little energy, aided by the fine machinery used in other countries, might raise its character and price to its proper position, to say nothing of its improvement for home consumption, which is so large—although, perhaps, such improvement would not suit the taste of the Spaniards, who, as a rule, might deem it tame and insipid were it deprived of the sting and smack which so invariably accompany it. The olives are gathered carelessly. They are beaten off the trees whilst yet green, and heaped up in yards, where they are allowed to heat and ferment for months, so that when they are ground and pressed they more resemble masses of manure than any other substance. Then the application of scalding water to the paste whilst pressing assists in the extracting of all the foul and putrid essences.

USEFUL INFORMATION.

Glue and Its Preparation.

A good article of glue is one of the most important articles in the whole round of wood workers' materials. This subject was lately fully discussed in *The Hub*, and therefrom we draw points of leading importance. In the selection of glue, the testing of it, so as to form some estimate of its adhesive qualities, is a matter of first importance. All glue in the cake is subject to be influenced by the moistness or dryness of the atmosphere, becoming soft in damp weather and crisp in dry weather, but different kinds are differently affected and hence it is better to purchase in dry weather, as that which is then soft is not of as good quality as that which is crisp, and it should be borne in mind also, when purchasing, that the most transparent is generally the best. It is always advisable, before purchasing, to submit to experiment a sample of the article offered. To do this, take a cake of glue, place it in a pan and cover it with water, when, after some hours, if it be good glue, it will swell but not dissolve, while, if bad, it will partly if not wholly dissolve in the water. Another test is this: After being dissolved by means of heat, that glue is best which seems most cohesive or which is capable of being drawn out into thin filaments or strings and does not drop from the brush or glue stick as water or oil would, but rather extends itself in threads as it falls from the brush or stick, and if the glue possesses the requisite properties, this will always be found to be the case.

The preparation of glue is very simple. It is first broken up in small particles and put in a vessel, covered with cold water and left to soak for a number of hours, the length of time required for soaking being generally governed by the strength of the glue, the strongest glue taking the longest time. After being soaked until it all swells and becomes soft and gelatinous (avoid oversoaking), it is then placed upon the fire to cook, being kept stirred until it is thoroughly dissolved and appears stringy, as we stated above. It is then ready for use; but in factories where a large quantity is employed, it is then poured out in a large flat pan and left to cool, and the workman, when desiring it for use, cuts off the required quantity and heats it. I would remark here that it is a bad habit for workmen to allow the glue pot to remain on the stove after they are done using it, as a very prolonged heat will destroy the adhesive qualities of the glue.

As a novelty in the way of preparing glue, the pulverized article has recently been introduced to the trade. It seems that the pulverized glue is recommended for its convenience, being more quickly prepared for use than that which is in cakes, the latter requiring several hours to soak, whereas the pulverized can be soaked just as thoroughly in a few minutes; and this is a great advantage, particularly in warm weather, when glue put to soak is often liable to spoil. Again, if a workman's cooked glue runs out, he can in a short time prepare more from the pulverized, and this is often a great convenience, as every workman knows, especially when quitting time is near at hand.

Always use the glue hot and if possible warm the pieces of wood to be joined together. If the wood is cold, it will so chill the glue that a good and permanent joint is impossible. After the glue is applied, the woods, if the shape allows, should be tightly clamped together and left for several hours till thoroughly dry. A cabinet maker's two-inch or three-inch malleable clamp, or larger wooden clamps, are very useful for this purpose. There are many articles the amateur will make, such as light brackets, card baskets, etc., the various parts of which cannot be clamped together. They can, however, be bound together by means of cords, with wedges inserted to tighten the cords, and after the glue has set, strengthened with fine screws. Use the glue rather thin, apply it with a brush and avoid getting on too much.

We will add two further suggestions in this connection, namely, in applying glue, where the part is end grain, first fill the pores of the wood with thin glue and let dry, then clean off and glue at the joint with strong glue. Many a job has been spoiled by reason of neglecting to fill the end grain in this manner. Next, in adding water to glue, it is best to give the glue a boil before using again, so that it may be evenly and thoroughly mixed.

PETROLEUM IN FRANCE.—The French government is very shrewd in its action regarding the shipment of petroleum to its shores. In order to encourage domestic manufacture, a heavy import tax was levied some time ago upon refined oil, while the crude petroleum is permitted to pass into the country free of duty. In consequence, oil refineries have sprung up through the whole of France, and the export of crude petroleum to that country has increased wonderfully during the past six months. Three years ago the shipments to Antwerp were greater than to any foreign port, but at present the French have largely the advantage in the raw product, and the orders for this fall and the coming winter manufacture in that country are of extraordinary quantities. Spain, Portugal and Italy are purchasing largely of the

French refined article, which is said to cost them less than the American refined oil. The expenses of labor are less and French chemists claim to have discovered cheap modes of deodorizing and purifying the oil unknown to our refiners. It may soon become a serious question to the large refiners in this country whether the increasing shipments of French refined petroleum to the southern countries of Europe will not largely reduce the demand for their manufactures and materially affect their business. They should—and we doubt not they will—avail themselves of all the new discoveries for improving the character of the oil and lessening the expense. We understand that one has already in use a new mode of condensing the vapors, dispensing with the old-fashioned worm, and that the oil has been improved at a diminished cost.

To Silver Glass.

Prepare two solutions, says the *Jeweler and Silversmith*: 1. Argentic nitrate is dissolved in distilled water and ammonia added to the solution, till the precipitate first thrown down is almost entirely redissolved. The solution is filtered and diluted so that 100 cc. contains one gramme of argentic nitrate. 2. Two grammes of argentic nitrate are dissolved in a little distilled water and poured into a liter of boiling distilled water; 1.66 grammes of Rochelle salt is added and the mixture boiled for a short time, till the precipitate contained in it becomes gray; it is then filtered hot.

The glass having been thoroughly cleaned with (1) nitric acid, (2) water, (3) caustic potash, (4) water, (5) alcohol, and lastly, distilled water, is to be placed in a clean glass or porcelain vessel, the side to be silvered being placed uppermost. Equal quantities of the two solutions are then to be mixed and poured in, so as to cover the glass. This should be done while the glass is still wet with distilled water. In about an hour the silvering will be completed. Then pour off the exhausted liquid, carefully remove the glass, wash in clean water, rub off silver deposited where not required, allow to dry and varnish silver side with any thin varnish which does not contract much in drying. The time required for the operation depends on the temperature. If the solution be warmed to about 30° C., the silver is deposited in a few minutes, but it is safer to use them cold. The insides of test-tubes, bulbs, etc., are silvered by putting the solutions into them, no second vessel being then required. Throughout the whole operation the most scrupulous cleanliness is the grand essential.

CLEANING COPPER.—The removal of tin from copper vessels coated therewith, can easily be accomplished, according to Prof. Bottger, by immersing the vessel in a concentrated solution of sesqui-chloride of lime. In a very few moments the tin is removed from the copper, and nothing remains to be done but scour the latter with moistened sand and dilute hydrochloric acid to obtain a perfectly clean surface.

GOOD HEALTH.

A Food for Infants.

Suitable food for infants which are deprived of their natural pabulum is an important matter and has received the attention of the most eminent physicians. The German chemist Liebig devised a soup or pap for this purpose, being led to the task from the fact that one of his grandchildren could not be nursed by its mother. The following is Liebig's recipe and his description of the ingredients employed:

Half an ounce of wheat meal, half an ounce of malt flour, and seven and a half grains of bicarbonate of potash, are weighed, mixed first with one another, and afterwards with an ounce of water, and lastly with five ounces of milk. The mixture is then heated with constant stirring, over a very gentle fire, until it begins to grow thickish; the vessels are now removed from the fire, and its contents are stirred for five minutes; these are then heated once more and again removed, when a new thickening occurs; lastly, the whole is brought to a boil. After the separation of the bran from the milk through a fine sieve the soup is ready for use.

Wheaten Meal.—For this ordinary weal meal is chosen, not the finest or the first shot meal, which is richer in starch than the whole meal.

Malt.—Barley meal can easily be procured from any brewer. In Germany, or rather in Munich, the malt is so much dried that the starch of many grains appears to be half-roasted. This malt employed in making the soup gives to the latter a taste of bread, which is not unpleasant; usually the malt contains an admixture of many seeds of weeds, which must be picked out with the hand. An ordinary coffee-mill answers for preparing the malt flour, the latter must likewise be separated by means of a hair sieve, not too fine, from the chaff. Malt prepared from barley is to be preferred to that from oats, wheat, or rye.

Carbonate of Potash.—For the preparation of the solution the ordinary alkali salt, carbonas depurata of the pharmacists, answers very well; two ounces of the salt are dissolved in 16 of water. If spring water be used, there is generally a precipitate of some carbonate of lime;

after an hour the fluid becomes quite clear and bright. The carbonate of potash must not be greasy or damp. The bicarbonate of potash is the ordinary crystallized salt.

In order to avoid the rather troublesome weighing of the flour, we may observe that a heaped tablespoonful of wheat meal weighs nearly half an ounce; a heaped tablespoonful of malt flour, wiped off at one-half with a card, likewise weighs half an ounce. For measuring the solution of potash an ordinary thimble answers; this when filled holds nearly three grammes (45 grains, 2.8 cubic centimeters) of solution of potash.

For the milk and the water two ounces are weighed in an ordinary tumbler, then five ounces of water, and the heights at which both quantities of fluid stand are marked on the outside of the glass by attaching pieces of paper.

When the soup is prepared it is sweet as milk, and the further addition of sugar is unnecessary; it possessed double the concentration of woman's milk, and can, which is not unimportant for sucklings, be given in the nursing bottle. If it has been heated to the boiling point, it keeps good for 24 hours; if this has not been done it turns sour and coagulates like milk; if the addition of potash be neglected, it cannot, in general, be heated to the boiling point without coagulating. In the absence of the potash the soup is difficult of digestion like ordinary milk-pap.

POISON IN ENAMELED CLOTH.—It seems that the shiny covering of our baby wagons is sometimes a means of lead poisoning. The *Journal of Materia Medica* says: In Germany, where this enameled or "leather-cloth" is largely used, this suspicion has been confirmed by the occurrence of numerous cases of sickness among children who have been carried about in children's wagons which are covered with this cloth. The symptoms were invariably those of lead poisoning. An investigation was recently undertaken at the instance of the Imperial health office, and the different specimens of the cloth, both of German and foreign make, the enormous quantity of 45.7 per cent. of metallic lead was found; from a piece of cloth weighing 10 grammes, a mass of lead weighing 4.25 grammes could be obtained. The cloth burned readily, and drops of lead reduced to the metallic form could be seen running off, even when only a small piece of it was ignited. When exposed to direct sun-light, the varnish cracked and began to peel off. The board of health, consequently, earnestly warns the public to be aware of this wagon-covering, "in the sanitary interest of the children."

YERBA SANTA.—We notice by the last issue of the *Physician and Pharmacist* that the California shrub yerba santa (*Eriodogon Californicum*), is coming into high favor as a remedy for lung diseases. An essay on the subject by Dr. C. G. Polk, late Professor in the Pennsylvania College of Pharmacy, after giving detailed accounts of cases in which the remedy was employed by him, concludes as follows: "The yerba, by its splendid blending of tonic, astringent, balsamic and alterative powers, arrested the ulcerative processes in the lungs."

From the above cases it would seem that the yerba santa, as yet, has no equal in the management of chronic catarrhal diseases, exerting a peculiarly salutary influence upon the lungs, bronchi, or hemorrhoids. I would expect most excellent results in dyspepsia, and in both chronic diarrhoea and chronic dysentery."

NITRATE OF LEAD AS A DEODORIZER.—A correspondent of the London *Lancet* recommends nitrate of lead as a most effective deodorizer. Bad smells, he says, from whatever cause they may arise, are removed as if by magic by its use; it is also remarkably inexpensive, a pound of the material costing less than a shilling, and in combination with common salt, furnishing sufficient to make nearly 400 gallons of the fluid. To prepare it for use, it is simply necessary to take, for ordinary purposes, half a dram of nitrate of lead, dissolve it in a pint or more of boiling water, dissolve about two drams of common salt in a pail of water, pour the two solutions together and allow the sediment to settle. All that is required in order to immediately purify and sweeten a fetid atmosphere, however originated, is to dip a cloth in the liquid and hang it up in the apartment.

WARTS.—If they give you no special inconvenience, says *Hall's Journal*, let them alone. But if it is of essential importance to get rid of them, purchase half an ounce of muriatic acid, put it in a broad-bottomed vial, so that it will not easily turn over; take a stick as large as the end of a knitting-needle, dip it into the acid, and touch the top of the wart with whatever of the acid adheres to the stick; then, with the end of the stick, rub the acid into the top of the wart, without allowing the acid to touch the well skin. Do this night and morning, and a safe, painless and effectual cure is the result.

SKIN DISEASES.—We read in our medical exchanges reviews of a new elementary treatise on diseases of the skin for the uses of students and practitioners, by Henry G. Piffard, A. M., M. D., Professor of Dermatology, University of the City of New York, etc. We have long known Prof. Piffard as a most patient, diligent and thoroughly scientific investigator in this important specialty of medical work, and we are assured that his treatise will take high rank, and be of wide usefulness.



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THE ORIGINAL ARTICLES in this paper are mostly set in solid type, giving in our columns one-third more reading than is contained in ordinary leaded matter.

THIS PAPER will be supplied to the trade through the A. F. News Co., No. 413 Washington Street, S. F.

Our latest forms go to press on Thursday evening.

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A. T. DEWEY.....W. B. EWER.

DEWEY & CO., Patent Solicitors.
No. 202 Sansome St., N. E. Corner Pine St.

SAN FRANCISCO:
Saturday Morning, Jan. 5, 1878.

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Dividend Notice—Oerman Savings and Loan Society; The Victor Rock Drill, W. Weaver, Phoenixville, Penna.; Position Wanted, address B. S., this office.

The Week.

The week has brought the opening of the new year, and with it a temperature quite unusual in this halmy clime. The frosty mornings of the past few days seem a slice of Eastern winter weather, for we have seen ice half an inch thick forming in the troughs and buckets of water, a sight seldom seen in this neighborhood. The mantle of brilliant frost which has covered everything in the early day of late has had the effect of bringing out thick overcoats and gloves and has wrought havoc with the tender plants in many of our gardens. All this time the skies are bright and clear, and the sunshine warm in the middle of the day. With the week also comes a new volume of the PRESS, a fact of which our readers will no doubt take note, and we hope a result will be a general renewal of subscriptions and the advent of a number of new names. Although the farmers and miners are still in want of more rain, for present purposes considerable has fallen. We can only hope for more abundant pluvial blessings this month to make glad the hearts of all men. With even an ordinary rainy season, such ample time have our miners had for preparation, that they ought to be prosperous this year. With an abundant snow supply in the mountains this winter, the spring will bring a harvest of gold such as we have not seen for several years.

A New Volume.

This number of the MINING AND SCIENTIFIC PRESS is the first of volume XXXVI, and we hope that our readers of last year will continue with us through this one. We have aimed to continually improve the Press from year to year, and do not intend to cease our efforts in this direction now. The fact that times are hard is no excuse for any milder or mechanic to cease reading his home paper. People progress in both good and bad times, and because husiness is somewhat dull now it is no reason that it will always remain so. We look forward to renewed prosperity among our miners and manufacturers this year, and believe that the depression of last year will have more of a salutary influence than otherwise. People will speculate less and look more favorably on legitimate enterprises. This will be better for real miners, and have the effect of giving employment in industrial pursuits to more working men.

It is but proper to suggest at the opening of the year that this is a good time for new subscribers to send in their names and for old ones to renew their subscriptions. The readers and publishers of a newspaper have mutual interests which cannot be dissolved without injury to both. The publishers cannot do without subscribers any more than the readers without a paper. The individual contributions of each miner and mechanic goes to swell the amount necessary to carry on a technical journal of this kind. It is their duty to assist us with the "sinews of war," as it is ours to uphold their interests and furnish mental food for them. One cannot do without the other. It makes rather a distressing picture to imagine what would become of the newspapers without subscribers, but it is still a more distressing one to think of the people without newspapers. No one would get the experience of others at home and in different parts of the world, and the wheels of progress would be blocked entirely. Perhaps if readers would turn their thoughts in this direction occasionally they would appreciate the efforts of publishers better, and attend to their part of the moral duty more promptly. They would see that no one could run a newspaper without money, and would contribute their share with willingness, and without even being asked for it. When this feeling once began to take possession of them half the worry and work of editors and publishers would cease, and their tasks be more congenial and pleasant.

Now although we have a good many subscribers, we have room for a good many more, and by widening our field of usefulness can benefit others as well as ourselves. It takes considerable money to conduct a paper of the character of the PRESS, and we would be rejoiced to see our lists twice as long as they are. This can be accomplished easily by the help of our friends, among whom are all our present subscribers and advertisers. A word aptly spoken is often equal to a subscription, a hint which we hope our readers will hear in mind.

And now that we are fairly started in on another year's work, it shall be our aim as it has been before, to improve the PRESS in every particular and continue to make it useful to the miner, mechanic, manufacturer, lover of popular science and industrial readers everywhere.

THE OAKLAND MECHANICS' INSTITUTE.—A practical move is on foot in Oakland to establish a mechanics' institute there which is to be a real school of technology. Col. John Scott, a liberal-hearted citizen of that town has come forward with an extremely liberal donation to start it in the shape of a site for the buildings. A considerable sum is required for the purpose and a number of gentlemen are now devising ways and means. We shall shortly give an engraving of the proposed building and such details of the plan as have been arranged. It is to be hoped that the project will receive the attention it warrants from all good citizens.

METEOROLOGICAL SUMMARY FOR DECEMBER.—The report of the U. S. Signal Service officer, of San Francisco, for the month of December is summarized as follows: The mean height of barometer for the month was 30.04; mean temperature, 52.6°; mean humidity, 73°; prevailing winds, north; highest barometer, 30.338; lowest, 29.674; highest temperature, 64°; lowest, 42°; monthly range, 22°; greatest velocity of wind, 20 miles per hour; total number of miles traveled by wind, 4,058; total rainfall, 2.66 of an inch. Rainfall in December during former years: 1871, 14.36 inches; 1872, 5.95 inches; 1873, 9.72 inches; 1874, 0.33 of an inch; 1875, 4.15 inches; 1876, 0.00 inches.

The firm of Spaulding & Barto, printers, for many years in the same building as our editorial and composing rooms, No. 414 Clay street, have admitted to partnership, Mr. Solon H. Williams, and now style themselves Spaulding, Barto & Co.

The French Academy of Naval Sciences has elected Ralph Waldo Emerson one of its foreign associates.

The Bullion Product of 1877.

Through the kindness of Mr. Valentine, General Superintendent of Wells, Fargo & Co.'s Express, we have received the following circular relative to the bullion yield of this coast for the year 1877:

EDITORS PRESS:—The following is a copy of our annual statement of precious metals produced in the States and Territories west of the Missouri river, including British Columbia and the west coast of Mexico, during 1877, which shows an aggregate yield of \$98,421,754, being an excess of \$7,546,581 over 1876, the greatest previous annual yield in the history of the country. Arizona, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah and Washington increase; British Columbia, California, Mexico and Montana decrease; but it is possible the falling off in Montana is more apparent than real. In our statement for 1876, Dakota (Black Hills) was not mentioned. It appears herein credited with \$1,500,000 gold, but the estimate is uncertain, as \$950,000 is the total amount carried out by all express companies and mail. The amount named as carried by other conveyances is conjecture. If the Comstock mines yield as much in 1878 as during the past year, the aggregate product of silver and gold will approximate \$100,000,000.

Statement of the Amount of Precious Metals Produced in the States and Territories West of the Missouri River, During the Year 1877.

States and Territories	Gold dust and bullion by express.	Gold dust and bullion by other conveyances.	Silver bullion by express.	Silver bullion by other conveyances.	Total.
California.....	\$14,512,123	\$725,606	\$1,391,751	\$1,734,226	\$18,114,716
Nevada.....	492,660	108,600	44,320,044	61,580,000	62,120,264
Washington.....	993,831	88,834	92,202	92,202	1,101,197
Oregon.....	83,842	9,820	1,892,400	1,892,400	1,976,220
Utah.....	1,400,000	171,601	3,120,000	2,664,412	5,255,013
Montana.....	1,540,000	91,000	1,480,000	6,120,000	9,241,000
Idaho.....	91,000	9,110	1,197,801	1,664,411	2,962,312
Colorado.....	3,161,277	1,169	273,840	370,430	3,536,296
New Mexico.....	1,169	122,857	506,549	1,750,206	2,380,671
Arizona.....	590,000	72,144	1,600,000	1,450,000	3,762,144
Dakota.....	72,144	11,003	1,020,686	340,212	1,493,045
British Columbia.....	1,106,027	11,003	1,020,686	340,212	2,477,928
Total.....	\$34,671,400	\$1,853,381	\$32,000,214	\$19,291,209	\$86,816,204

We have used the utmost care and diligence in ascertaining the character of bullion and ores reported, with the following result. The yield of the Comstock mines is 45% gold; of the whole bullion product of Nevada, 37% is gold; and of all so-called silver or base bullion, 28% is gold. The gross yield for 1877, shown above, segregated, is, in round numbers, as follows:

Lead, 5%.....	\$5,085,250
Silver, 45%.....	47,206,957
Gold, 47%.....	46,129,547

As lead is an important element in what is herein termed base bullion, we might add that of Missouri and Illinois, value approximately \$1,500,000; which, with the silver and gold of the Lake Superior country, Virginia and North and South Carolina, amount say \$500,000, would swell the gross product to over \$100,000,000 for the year. The lead product of Utah, Nevada and California, exceeds that of the remainder of the United States and Territories combined; and in tonnage is greater this year than ever before, though not exceeding in value that of 1876, the average price having been lower than for many years past.

In our statement of 1876, the amounts credited to British Columbia and west coast of Mexico, were inadvertently carried into the totals credited to the United States, in the estimates given on the right-hand page of the statement. Deducting amounts from the sources named, the results are as follows:

The net product of the United States and Territories west of the Missouri river, divided as follows:

Year.	Products of the U. S. & Territories west of the Missouri river, including Alaska and Mexico.	Products of British Columbia and Mexico.	Lead.	Silver.	Gold.
1870.....	\$54,000,000	\$32,151,000	\$1,080,000	\$17,320,000	\$33,750,000
1871.....	55,240,000	35,740,000	2,100,000	19,285,000	34,330,000
1872.....	62,238,353	40,331,324	2,250,000	19,524,424	38,109,385
1873.....	72,358,693	70,139,354	3,450,000	27,433,812	39,206,558
1874.....	71,401,015	71,935,611	3,800,000	29,639,122	38,464,438
1875.....	80,889,057	76,703,452	5,110,000	31,655,239	39,948,194
1876.....	90,875,173	87,219,355	5,040,000	32,222,221	42,550,735
1877.....	98,421,754	95,811,581	5,085,250	45,846,109	44,830,233

We are uninform as to the actual exports of silver to India, China and the Straits previous to 1851, but assume that they were less than

since that date, which being so, the exports this year are the greatest known, viz.: \$105,000,000 to the 26th inst. The greatest amount in former years was \$83,650,000, in 1857. The amounts exported during the present year were approximately as follows: From Southampton, \$80,000,000; from San Francisco, \$19,000,000; from Marseilles, \$4,000,000; from Venice, \$2,000,000.

We take pleasure in acknowledging the prompt responses of persons applied to for information, and to whose cordial co-operation we are indebted for much of the data necessary to our compilations.
JNO. J. VALENTINE,
General Superintendent.

Production of Coin.

The operations of the Mint in this city for the past year have been unprecedented in the records of coinage in any similar institution in the world. The total value of the coinage of the year is \$49,772,000 in 28,025,100 pieces, as shown by the table given below. The San Francisco Mint is now the most important in the United States, as it coins so much of the original product of the mines. The bullion product of the Pacific coast States and Territories for the past year, according to figures given by Wells, Fargo & Co's agent in another column was \$98,421,754. Of this the San Francisco Mint has coined nearly \$50,000,000. A great deal of the bullion has been shipped abroad. A change in the Mint administration occurred on the 1st inst., Mr. Dodge taking the place of Gen. La Grange as Superintendent. The old employees will be retained for a time, at least. Frank X. Cicott, the coiner, furnishes the following statement of the coinage during the month of December:

Gold.

Double eagles.....	\$1,920,000	96,000
Trade dollars.....	\$ 573,000	573,000
Half dollars.....	250,000	500,000
Quarter dollars.....	130,000	520,000
Dimes.....	10,000	100,000
Total Silver.....	\$951,000	1,819,000

Grand Total.....\$2,901,000 1,015,000

Coinage of the Half Year.

The coinage of the half year, since the annual settlement in June, has been as follows:

Gold.

Double eagles.....	\$ 21,100,000 1,055,000
Eagles.....	115,000 1,150,000
Half eagles.....	101,000 505,000
Quarter eagles.....	85,500 427,500
Total Gold.....	\$21,390,500 1,120,100

Silver.

Trade dollars.....	\$4,420,000 4,420,000
Half dollars.....	1,520,000 3,040,000
Quarter dollars.....	1,950,000 380,000
Dimes.....	78,000 780,000
Total Silver.....	\$7,118,000 12,020,000

Grand Total.....\$28,512,500 13,740,100

The Year's Coinage.

Coiner Cicott gives the following statement of the coinage at the United States Mint in this city during the year 1877:

Gold.

Double eagles.....	\$84,700,000 1,735,000
Eagles.....	170,000 17,000
Half eagles.....	138,500 26,700
Quarter eagles.....	85,500 427,500
Total Gold.....	\$85,092,000 1,814,100

Silver.

Trade dollars.....	\$9,510,000 9,510,000
Half dollars.....	2,678,000 5,356,000
Quarter dollars.....	2,240,000 8,960,000
Dimes.....	234,000 2,340,000
Total Silver.....	\$14,660,000 26,210,000

Grand Total.....\$99,752,000 28,025,100

The Carson Mint has been in operation since January, 1870. The coinage executed during the year has been as follows:

1877.	Gold.	Silver.	Total.
January.....	\$250,000	\$250,000	\$500,000
February.....	454,000	454,000	908,000
March.....	395,000	395,000	790,000
April.....	\$ 80,000	456,000	536,000
May.....	26,220	275,000	301,220
June.....	162,600	221,000	383,600
July.....	188,000	188,000	376,000
August.....	310,720	217,000	527,720
September.....	145,000	132,000	277,000
October.....	20,000	225,000	245,000
November.....	167,000	167,000	334,000
December.....	154,450	166,000	320,450
Totals.....	\$ 935,920	\$9,085,000	\$10,020,920
1870.....	2,854,215	3,292,350	6,146,565

The amount of coin executed during the past year shows a falling off of one-third as compared with the previous year, chiefly due to smaller gold deposits. This Mint has coined, since it was started, \$21,809,344, of which \$10,625,790 was in gold and the balance silver. The largest coinage was in the year 1876, when it turned out \$6,454,525. In addition to the coinage during the period mentioned, \$24,543,849 in bars was refined. The Mint has been economically managed. In commenting upon the affairs of the Carson Mint, the *Territorial Enterprise*, under date of December 22d, said: The earnings and gains of the Mint from 1870 to 1877 amounted to \$1,318,406, while the expenditures during that period were \$1,519,332, leaving the excess of expenditures over receipts \$200,926. The Mint has, therefore, cost the Government but about \$25,000 per annum during the time it has been in operation. Niggardly appropriations from year to year have somewhat embarrassed the operations of the Mint. Should silver be remonetized,* the increase in silver coinage which must follow will compel a corresponding increase in the operative force and machinery, for both have heretofore worked to their fullest capacity. This, we trust, will not escape the attention of Congress.

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The Exchequer Mining Company.

We have received from England the report of Mr. Henry Sewell, on the Exchequer mining property, in Alpine county, in this State. The company is an English one, and being dissatisfied with continued disbursements and no dividends, sent Mr. Sewell here to examine into the causes and report thereon. We have previously referred to the tenor of this report, and having it now at hand, make some extracts from it. After speaking of the geology of the country, etc., he says: "I am not very confident as to finding any quantity of pay ore in these levels, that is from the 200 up to surface. In the 300 there is a point of about 100 feet in length, which looks very promising, spotted about with rich ruby ore, and work ought to be commenced there to prospect it thoroughly. The lode varies continually on this level and becomes hard and compact, and leads me to expect that future explorations may bring us across a body of rich ore. The 400 level has been explored too short a distance horizontally, and driving should be continued on it. Here, close to the face of the level, we have ruby silver spotted all over the quartz, indicating the possibility of meeting a body of ore. I would likewise recommend the sinking of a winze some ten feet from the present face and connect it with a main winze (on the lode) opposite to the present perpendicular main shaft. In this manner the work could be carried on in a cheap and expeditious manner, thus avoiding the present expensive and slow process, namely, that of sinking a perpendicular shaft, (outside the vein) and also of having to drive crosscuts to reach it." The report then speaks of the advantages of shafts driven on the lode instead of a perpendicular one.

"The general mass of the ores up to the present at the mine is too poor to extract, much less to pay freight on it to the mills. Still, small parcels of ore of good quality in many places in your mine, and samples or specimens of rich ruby ore, often assaying \$800, induces me, as a mining man, in advising you to continue your explorations. And this advice I give you conscientiously, as, in miner's parlance, you may be otherwise throwing away a good chance. Especially, and with more reason, as you have no necessity for any further surface outlays on steam hoisting works (of the first-class), mills, furnaces, buildings, roads, etc., which have cost immense sums of money and time.

"The past of this company has been the chronic disease of most English companies in the United States. First sending out a man who was not a theoretical or practical mining engineer, or even a practical miner, and one who had never seen a mine in his life. Then the surface outlays in the shape of mills, furnaces, buildings, etc., have been recklessly premature. A thousand tons lying at the Exchequer mill might be sorted and about 50 tons of \$70 ore be collected. In fact, if the mines could speak they would exclaim: 'We have been robbed of our legitimate rights, and if those large sums of money had not been paid out recklessly and most prematurely on outside works, we would not have fallen into premature ruin.'

"I advise you to pay your debts, especially as I have saved you £9,000 in the arrangements with the creditors, which you can employ in future explorations, and on no account allow a single dollar to be spent on outside works, and only on the legitimate work of developing your mine. The advantages of the district are great. First, your lodes are not hard and are easy of driving. You have cheap timber and fuel all around within a few hundred yards, and all for the expense of cutting. A good wagon road of about two miles leads down hill to the mines. These are advantages seldom found in mining districts."

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Grand Prize, Dec. 28th, \$16,400; Leopard, 27th, \$3,300; Tyho Con., 24th, \$4,030; Northern Belle, 24th, \$3,002.02; Arizona, 27th, \$1,470.17; California, 31st, \$558,903.66; Con. Virginia, 31st, \$540,196.05; Northern Belle, 29th, \$2,797.73; Alps, 31st, \$3,736; Endowment, Jan. 2d, \$2,467.10.

Free Reading Rooms.

We had the pleasure, on Saturday evening last, of listening to the first of the series of lectures for the benefit of the Oakland free library, the subject of this one being "The Drama," by Hon. Nathan Porter. The lecture (a very able one) was delivered in the Congregational church before a large and appreciative audience, embracing all classes of citizens. Following is a list of the coming lectures of the course: "Evolution in Relation to Materialism," by Prof. Joseph LeConte; "Nebular Hypothesis," by Prof. John LeConte; "Irrigation," by Prof. Geo. Davidson; "An Apology for the Turk" (by request), by Prof. Bernard Moses; "Recent Geographical Discoveries," by Hon. W. C. Bartlett; "Our Nerves," by Dr. Dio Lewis. The tickets for the course are sold at \$1, and those for a single lecture at 25 cents. A grand musical entertainment will be given at the close of the course, free to holders of season tickets, but single tickets for this will be 50 cents.

The Union Reading Room Association has done credit to itself and the city of Oakland, in arranging for such popular low-priced lectures in these hard times. It places within the reach of that class deserving of and mostly to be benefited by such entertainments, amusement and instruction combined, at a price with which no fault can be found. As a general thing the cost of such entertainments is so great as to prevent mechanics and other working men from attending; but the result of the experiment

John S. Hager, Irving M. Scott, R. J. Tobin, E. D. Sawyer, John H. Wise, A. J. Moulder, Louis Sloss, A. S. Hallidie, C. C. Terrill and Henry George are instituted and appointed during good behavior, honorary Trustees without salary, of any library or reading room in the city and county of San Francisco. These Trustees are clothed with powers to make rules and regulations for the government of the library or reading room. This is for this city. In other places the term of office of Trustees is limited to four years.

One of the clauses is as follows: "The proprietors of any subscription or other library may, upon such terms and conditions as shall be agreed upon by them and the municipal authorities of any incorporated city, town or city and county, donate and transfer its property, real and personal, to any such city, town or city and county, for the purpose of establishing and maintaining a public library within the meaning of this Act. As a condition of any such donation, such proprietors shall nominate and appoint, as honorary Trustees, a number equal to those authorized, and to be appointed as hereinbefore provided. A majority of such honorary Trustees may fill all vacancies that may occur in their number. Such honorary Trustees shall have an equal voice with the other Trustees appointed, as hereinbefore authorized, in the management and control of such libraries as may be donated and transferred under the provisions of this section."

All this is the direct result of the work commenced in Oakland by a few gentlemen who saw the need of free reading rooms for the public, and who were public spirited enough to give

timber enough to last six months or a year. The company have also a saw mill attached to the hoisting works, by which they dress their timbers, etc. There are only three in the company, Thomas Mootry, Jr., W. A. Coughanour and David Coughanour. They hope to reap a fortune out of the second level, and are proving that there is at least one dividend-paying mine in the Boise country. At the mill they lately crushed some ore for miners on Canyon creek, three miles southwest from this mine. Jack Gorman & Co. and Harding & Co. had rock crushed that yielded \$100 per ton. Packing it to mill on mules and wagons cost \$7 per ton and the milling \$7 per ton. This section is looking up and parties working quartz seem to be going in for making the mines pay on their merits alone and not by assessments as elsewhere. The winter has so far been very pleasant, with some little snow and not very cold or stormy weather. The miners are now taking their comfort and having a good time, hoping for a good mining season next year.

The Sierra Flume and Lumber Company.

We have on several different occasions presented views of the works and mills of the Sierra Flume and Lumber Company, and herewith give one of their Champion mill, which has a capacity of sawing 40,000 feet per day. We have previously given our readers a pretty full account of this company and the work it is accomplishing. The undertaking is the largest of the kind in California, employing over 500 men in the various departments. They cut last year upwards of 50,000,000 feet of lumber and brought it to their yard for sale. The property of the company is worth \$170,000, a portion of which came from their earnings. There are over 150 miles of V flume operated by the company, 157 miles of telegraph lines, and 11 miles of tramways for logs. There are 10 fully equipped saw mills, three planing mills, and one sash and door factory. The mills are run by steam and water.

This company has probably the best system of V flumes in California, everything being built substantially and in the best possible manner. They have tapped the numerous springs and creeks in the vicinity of the flumes, and collected all the available water to furnish as large a supply as possible to the flumes. The engineering difficulties in the way of building

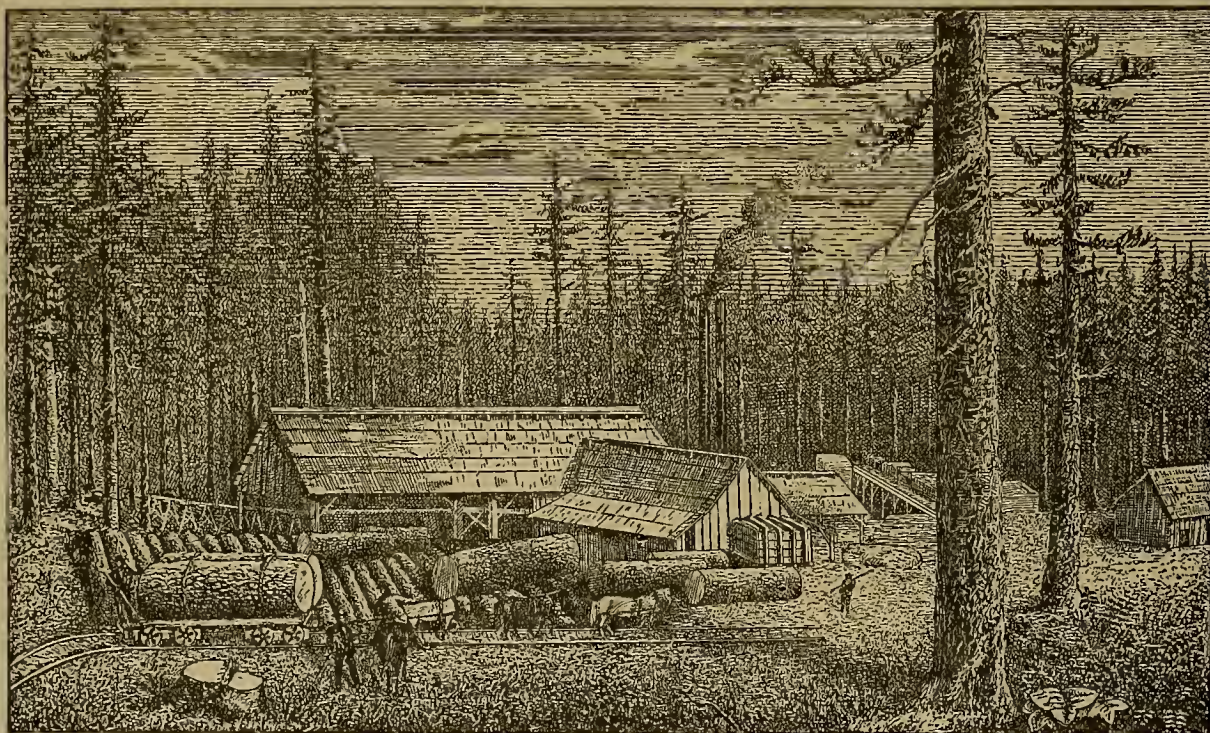
these flumes are even greater than on railroads, and when it is recollected that they are all in a mountainous region, the task accomplished is appreciated.

WHAT IS A "MODOC" ENGINE?—These powerful engines, says the *Coal Trade Journal* are in use on the Pennsylvania railroad. They are taking the place of the smaller engines, and are a saving of both labor and fuel. Their dimensions, etc., compared with the smaller engines, are as follows: Modocs—weight, 96,000 pounds; cylinder, 24x22; driving wheels, 50. Small engines, 74,600; cylinder, 18x20; driving wheels, 54. The Modocs with train are manned by a crew of seven all told. They draw a train of 31 to 37 loaded cars to Philadelphia, and burn on the round trip an average of 275 bushels of coal. The smaller engines and train, manned by a crew of six men, draw only from 20 to 24 loaded cars to the same point, and burn on round trip an average of 200 bushels of coal, that is with the addition of one man to a crew and the additional consumption of about 75 bushels of coal, the company is able to transport from 13 to 16 more cars over the road to Philadelphia.

A MOVEMENT is on foot in Oakland to establish an *Mechanic Arts* school where boys may learn trades. Col. John Scott has made a liberal donation, and the plan is now under discussion.

A TERRIBLE hard winter is anticipated in England, Scotland and South Wales, and the average poor rate will probably be higher than it has been in 20 years.

B. P. KOOSER, an old pioneer, and until lately, editor and proprietor of the *Santa Cruz Sentinel*, died at Santa Cruz on January 1st.



THE "CHAMPION" MILL OF THE SIERRA FLUME AND LUMBER COMPANY.

inaugurated by the Union Reading Room Association shows that low-priced lectures can be made a success. It is noteworthy that Oakland, which has been rather apathetic as to lectures, responded nobly in this case, showing that price had a great deal to do with it.

Another thing in this connection, however, is that the cause is a worthy one. After a great deal of trouble and labor the Managers of the association have provided good rooms, with plenty of papers and books, where any one, the capitalist or laborer, is welcome to come. There are here no social distinctions whatever, one man having equal rights and privileges with another. No fees are charged, and any one who chooses has the privilege of visiting the rooms.

It is to the credit of the Managers that through their efforts Oakland led off practically on the free reading room question; Alameda followed and is doing well. As a result a joint stock association there is erecting a ten thousand dollar building, the largest public hall in Alameda, for the purpose. San Francisco follows, and in examining the field concluded that in the great metropolis of the Pacific it should be a municipal institution, so Senator Rogers—all honor to him—has drawn up a bill which is likely to become a law and the results of which will do an immense amount of good in cities built or now building in California. The Rogers bill to establish and maintain free public libraries and reading rooms, authorizes the various Boards of Supervisors of the various counties, and of the city and county of San Francisco, and the municipal authorities of incorporated towns and cities of this State to levy and collect annually a tax not exceeding one mill on the dollar for the purpose of establishing free public libraries and reading rooms, putting up buildings and buying books. The same authorities may appoint seven Trustees to carry out the ideas of the act. All moneys collected go to a "library fund," and can only be used for the purposes specified. The following 10 persons,

time and labor to inaugurate the one over there. The friends of the Union Reading Room Association hope to advance, and add new and appropriate features to make their good work felt in a wider range of benefits. It is not often that a course of seven lectures is given for a sum of \$1, especially when the lecturers are persons of the education and intelligences such as those chosen by the Oakland association. The cause is a worthy one, and should be upheld by all good citizens, and the example set by Oakland can be followed with benefit by other towns and cities, if a few liberal-hearted citizens take hold of the matter.

From the Boise Country.

We have received the following information in a private letter, concerning the Gold Hill mine, Granite creek, Boise, Idaho: The 25-stamp mill is running steadily on good ore and they hope to keep it going all winter. A shaft has been started to tap the mine at a depth of 250 feet, which will give 150 feet of new ground. They have been working the first level, 100 feet from the surface, for some two years past, in good milling ore. In the Southwest extension of the Gold Hill they struck this summer the original ledge, which had been passed and are now getting splendid ore from it. The mill is running to its full capacity. The mine has besides the mill good hoisting works, etc. W. A. Coughanour is Superintendent; Wm. Frame, foreman, and — Phillips, engineer. The company is working 60 men all told, but when the shaft is down 100 men will be employed. Business is done on a cash basis, all accounts being settled monthly, so they always know where they stand. They have now on hand 1,500 cords of wood, and

Pocket Mining.

A correspondent of the Tuolumne Independent writes on this subject as follows: Many miners when they have the luck to strike a pocket of gold in quartz are content to take that which is in sight, and fancy that this is all to be obtained. This is a wrong idea, for the experience of the best "pocket" miners is, that if after taking out the gold in sight, that if a shaft is sunk, following the "strike" of the quartz, another pocket almost invariably is reached at the depth of 16 or 20 feet, more or less. Of course the richness cannot be calculated exactly, some being richer and some poorer. Yet as a general rule the deeper the deposit the probabilities are that the "pocket" will be in proportion richer. The reason of this will be seen hereafter, because the sublimation of the lower levels is arrested by the mass of quartz above. By continuing to sink, another pocket will be reached; continuing this system of sinking many thousands of dollars will most certainly be taken out, which will be lost to the general miner, who mines in the old-fashioned way and who abandons his lead after taking out the first pocket he has struck. This is important information for pocket miners, and is worthy of at least a trial. It was by this system of mining Nick Bauli's claim proved so rich and prolific in pockets. The Ogden Bros. have also tried it, and found that it worked well, and why should not others find the system to work equally well in their claims? Miners, give it a trial, and see whether the rule is true or not. You have to try somewhere after taking out your pockets, why not where you are? At any rate it is worth while to prove the correctness of the theory. If it be proved true by experienced miners, it will give a new impetus to mining, and add greatly to the wealth of Tuolumne county.

Reasoning this way after a pocket is reached and taken out, the miner ought to sink from 16 to 20 feet at least through dead or unproductive quartz, before he can reasonably expect to find a pocket; but when found do not stop here; keep sinking, and ten chances to one you will be rewarded indefinitely as to depth of the shaft and the richness of the rock. As a rule, when coming near a pocket, colors will be seen in the rock at first scattering, but becoming richer as you approach the pocket. The theory is that all pockets are in chimneys, and have been concentrated into pockets, like the gold in flues where much gold is being melted, is caught on the sides of the flues from the "sublimation" of the gold in the process of "smelting." Webster defines the word "sublimation," as being the "operation of bringing a solid substance into the state of vapor by heat, and condensing it again into a solid by cold." Now if we suppose that as gold is a deep lying metal in a fluid condition its normal state, and that it is now in the quartz as a solid metal, it is probable that in the times of the volcanic ages this was sublimized, and forced up with the molten quartz—for quartz is of volcanic origin. It stands to reason that the gold would be carried up along with the vaporous quartz in the form of a vapor. Now the upper quartz as it receded from the heat of the internal fires would naturally sublime first into a solid, because quartz is not so good a conductor of heat as is the gold. Therefore it is reasonable to suppose that the gold, whilst being sublimated, would be arrested by the cooler quartz. At first in small particles, and as the quartz got cooler, in larger masses, until a "pocket" was formed. Now suppose after one volcanic throes, another some time after occurred, it is probable that, following this same law of "sublimation," another would be found. Following this reasoning *ad infinitum* it is evident that other pockets will be found, and who knows to what depth, or whether this process in not even now going on down deep in the bowels of the earth. Webster also says in regard to "sublimation," that it bears the same relation to a solid that distillation does to a liquid. He remarks that both processes purify the substances to which they are severally supplied by separating them from fixed and grosser matter with which they are connected. If I were to write an hour I could not explain the process better or clearer than he has. You see, therefore, the theory is reasonable and worthy of attention and good trial.

A Question of State.

What shall we do with our squirrels? Twenty years ago there was no ground squirrel nuisance within 20 miles of Oakland. Now the pests are almost ruinous to the cultivation of land close to the limits of a city of 40,000 inhabitants; and so they are spreading thicker and thicker, year after year, over the country. It costs the farmers of this State an immense sum to even partially defend themselves against the encroachment of these pestilential rodents; and still it is a fact that their numbers increase in nearly every district and county in the State. Accordingly the value of land is decreased, or its enhancement retarded. The reputation of our land thus suffers at home and abroad, and the taxable property in the State is to-day nowhere near what it would be if the State and county officials had by legislation given farmers proper power and assistance for exterminating these pests. The reputation of the State is more or less at stake. Now let the present Legislature take some action. No doubt more than one method of encouraging their extermination will be nec-

essary. The more simultaneous that action can be had along the whole line, the more economical will be the results. One thing the State can certainly do to advantage and without loss. It can purchase and properly prepare for use poison in large quantities and furnish it at half the present price to counties and individuals. This would be a great assistance, and cause a great many land-owners to poison squirrels on large tracts where it is now their selfish interest to let the varmints alone. But the State can afford to do better. It can through a commission determine the most effective poison and instruments for killing squirrels, publish reliable information of thorough tests and careful experiments. It can afford to furnish materials to the various counties at one-half the first cost. In turn, the counties can afford to furnish the same to land-owners at one-fourth the State charges, and in that way enable those who will voluntarily contribute their labor to receive the agency of destruction at a very small cost. This may not be the best plan which could possibly be adopted, but we are sure that it is one which would do a large amount of good. STRIKE TOGETHER.

WOODWARD'S GARDENS has the following new attractions: The buffalo, deer, large white skeleton, new museum, improvements in the zoological department, besides the other features which have made it popular.

OUR AGENTS.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.
J. L. THARP—San Francisco.
E. W. CROWELL—California.
A. C. KNOW—Pacific Coast.
C. N. WEST—Santa Cruz, Monterey and San Benito counties.
A. C. CHAMBERS—Tulare, Fresno and Inyo counties.
EDWARD S. BAKER—Australian Colonies and Sandwich Islands.
W. D. WHITE—San Bernardino and Los Angeles counties.
J. W. A. WRIGHT—Sacramento, Placer and San Joaquin counties.
B. E. LLOYD—Alameda, Contra Costa and Napa counties.
E. M. DENNY, Oregon.
F. B. ANDERSON, Nevada.
H. E. HALLETT—San Joaquin, Yolo, Yuba, Sutter and Colusa counties.

TO QUERISTS.

In propounding questions to the editorial, patent or business departments of this office, letter writers should be careful to enclose a stamp and addressed envelope if they wish prompt answer. If we were to furnish time, paper, envelopes and stamps, all free to parties who address this office on matters of more interest to themselves than to us, FIVE HUNDRED DOLLARS A YEAR would not cover the expense. This hint, however, is not intended for parties writing in our own or the public interest, or who would be obliged to delay writing at any time for want of an extra stamp.

Questions of the Times.

Which are the most reliable watches?
American watches, they are driving those of foreign make out of the market.
Which is the best American watch?
The Hampden watch, made at Springfield, Mass.
Why is it the best watch?
Because it is substantial in all its parts, constructed on the best principles and embodies those improvements which experience has shown to be most desirable.
Why is the Hampden watch so popular?
Because in buying one you are sure of getting a good time-keeper. While purchasing a watch of most other makes is like investing in a lottery—a great many blanks to one prize.
Which is the cheapest watch?
The most economical is the Hampden watch. For you can get one of these excellent time-keepers for less than it costs in a short time to patch up a poor watch, which benefits no one but the repairer.
Where can I get a Hampden watch?
By addressing the long established, practical watch-makers and jewelers, DEWEY & JORDAN, 433 Montgomery St., San Francisco, who will send you a descriptive price list, including the following styles of movements: "John Hancock," "Geo. Sam. Rice," "Chas. E. Hayward," "Aaron Egan," "Geo. E. Sandley," "Chester Wolworth," "Frederick Billings," "Railway," "John L. King," "E. W. Bond."

Contents of Pamphlet on Public Lands of California, U. S. Land Laws, Map of California and Nevada, Etc.

Map of California and Nevada; The Public Lands; The Land Districts; Table of Rainfall in California; Counties and Their Products; Statistics of the State at Large.
Instructions of the U. S. Land Commissioners.—Different Classes of Public Lands; How Lands may be Acquired; Fees of Land Office at Location; Agricultural College Strip; Pre-emption; Extending the Homestead Privilege; But One Homestead Allowed; Proof of Actual Settlement Necessary; Adjoining Farm Homesteads; Lands for Soldiers and Sailors; Lands for Indians; Fees of Land Office and Commissions; Laws to Promote Timber Culture; Concerning Appeals; Returns of the Register and Receiver; Concerning Mining Claims; Second Pre-emption Benefit.
Abstract from the U. S. Statutes.—The Law Concerning Pre-emption; Concerning Homesteads; Apendatory Act Concerning Timber; Miscellaneous Provisions; Additional Surveys; Land for Pre-emption; List of California Post Offices. Price, post paid, 50 cts.
Published and sold by DEWEY & CO., S. F.

Another Complaint.

LOS ANGELES, May 21st, 1877.
MESSRS. DEWEY & Co., Patent Agents, S. F.—Gentlemen:—I have just received my letters patent on machine for opening oyster shells, and compliment you upon your success. I shall not only contribute to you my own business, but also that of friends. Thanking you, gentlemen, for your promptness and the very thorough manner in which you have prosecuted this matter, I am, yours truly,
T. W. TEMPLE.

Any person receiving this paper after giving an order to stop it, may know that such order has failed to reach us, or that the paper is continued inadvertently, and they are earnestly requested to send written notice direct to us. We aim to stop the paper promptly when it is ordered discontinued.

Canadian Patents for U. S. Inventors and Patentees.

One Patent now Embraces all the English Provinces in North America, including the Canadas and British Columbia.

It is only recently that the Canadian Government has granted patents to United States citizens. In consequence hereof the many immensely valuable inventions patented in this country are now patented in Canada. Patents are much sought for and are readily disposed of at fair cash prices. In our country about three-fourths of all manufacturing is based upon patents, especially in the New England States no manufacturing business of any consequence is started without being protected by such. Our neighbors across the border have not been slow in observing and learning that inventions and patents are the foundation of all prosperity in manufacturing purposes. Hence all our patents for labor saving and agricultural machinery and innumerable improvements in home comforts meet a ready market in Canada. Inventors and Patentees should therefore not delay to secure their patents in Canada; many good inventions are already pirated by Canadians, who, against law and right, appropriate United States inventions and have them patented in their own name. After a patent is granted it is extremely difficult to prove who is the first and original inventor. Therefore, inventors and patentees to be safe, you will have to secure your patents in Canada without delay. We have facilities for securing Canadian patents second to none. Our charges for securing Canadian patents are about \$65. A model is required.
Inventors and patentees! do not delay and lose your opportunity. Things may change. With model and description of your invention remit \$25, and we will prepare all drawings and documents and forward them to you for signature. In about 30 to 50 days we can return your Canadian patent.

DEWEY & CO.,
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TWENTY-FIFTH YEAR—1878.

Hall's Journal of Health.

Contents of a Single Number:

The Little Courtesies of Life; Coughing in Consumption; Influence of Christianity on Medical Science; Ignorance and Ill Health; Rage and Ruin; Kindness the Best Punishment; Grass in Rum; Valuable Table; Incurable Insanity; Consumption—A Suggestion; The Spirit Rapper Premium on Babies; Our Proverbs; Wrecked Clergymen; Marrying Well; The Lifting Cure; Sea Sickness; Face Painting; A Filthy Atmosphere; The Latest Crazy Man; A Suggestion; The Erie Railway; Sick Children.

Published in New York. E. H. OIES, M. D., Editor.

This journal has maintained the highest record of any health journal issued in the English language. It is not the amount of matter published which makes it the most valuable journal, but the plain and condensed truths it furnishes concerning that which is of ever vital importance to its large list of readers.

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To subscribers of this paper.....75 cents.

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TESTING AND WORKING SILVER ORES.—This is the title of an illustrated work of 114 pages, for Miners and Prospectors, by Chas. H. Aaron, published by Dewey & Co. It is written for miners, in plain language, and with all necessary details in description. The author describes the different processes of roasting ores, the appliances, methods of testing ores, testing for a process, working samples, treatment of base metals, use of chemicals, leaching processes, different kinds of crushing apparatus, etc. This little work abounds with useful hints to miners and prospectors, and is written in a practical style. Price, post free, \$2.00. Address, Dewey & Co., MINING AND SCIENTIFIC PRESS, 224 Sansome St., San Francisco.

The Large Circulation of the MINING AND SCIENTIFIC PRESS extends throughout the mining districts of California, Nevada, Utah, Colorado, Arizona, Idaho, Montana, British Columbia, and to other parts of North and South America. Established in 1860, it has long been the leading Mining Journal of the continent, its varied and reliable contents giving it a character popular with both its reading and advertising patrons.

EVERY new subscriber who does not receive the paper and every old subscriber not credited on the label within two weeks after paying for this paper, should write personally to the publishers without delay, to secure proper credit. This is necessary to protect us and the subscribers against the acts and mistakes of others.

THE EXPLORERS', MINERS' AND METALURGISTS' COMPANION.—Comprising a practical exposition of the various departments of exploration, mining, engineering, assaying and metallurgy; containing 672 pages and 83 engravings. By J. S. Phillips, M. E. Price, cloth, \$10.50; in leather, \$12; postage 50 cents. Sold at this office.

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FOR GOOD LIVING go to Webster's Palace Restaurant, 218 Sansome Street, S. F. Best of dinners only 50 cents, from 5 to 8 P. M.

Business Directory.

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MINING LAWS AND DECISIONS.

Copp's Hand Book of Mining Laws.
In this little work is given the United States Mining Laws and Instructions. Also, a digest of the decisions under the laws, by the Secretary of the Interior and Commissioner of the General Land Office.

Forms are given for making out notice of location, proof of labor, application for survey, and in fact all the blanks a miner needs.

There is also a list of all the mines for which U. S. Patents have been obtained from July, 1866, to August, 1877, with location, township and range.

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Mill and Mining Supplies on Hand.

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TAXES. TAXES.

1877-1878.

Notice is hereby given, that a certified copy of the Assessment Book of the Taxable Property of the City and County of San Francisco, Real Estate and Personal Property (Subsequent Assessment Book included), for the Fiscal Year 1877-78, has this day been received; that the State, City and County TAXES for said fiscal year are now due and payable at the office of the undersigned, Room No. 1, City Hall, and the Laws in regard to their collection will be strictly enforced.

Taxes will become delinquent on the FIRST MONDAY in January, 1878, and unless paid prior thereto, Five per cent. will be added to the amount thereof.

WM. FORD,

Tax Collector of the City and County of San Francisco.

SAN FRANCISCO, October 22, 1877.

Montgomery Avenue Tax.

Notice is hereby given that a certified copy of the Assessment Book of Real Estate, which is subject to Assessment to defray expenses incurred by the opening of Montgomery Avenue, has this day been placed in my hands to collect Taxes thereon.

Said taxes are for the Fiscal Year 1877-78, and are now due and payable at the office of the undersigned, Room No 1, City Hall. All Taxes remaining unpaid on the FIRST MONDAY of January, 1878, will have Five per cent. added thereto.

WM. FORD,

Tax Collector for the City and County of San Francisco.

SAN FRANCISCO, October 22, 1877.

ASSESSMENT OF LANDS

Benefited by Widening Dupont St.

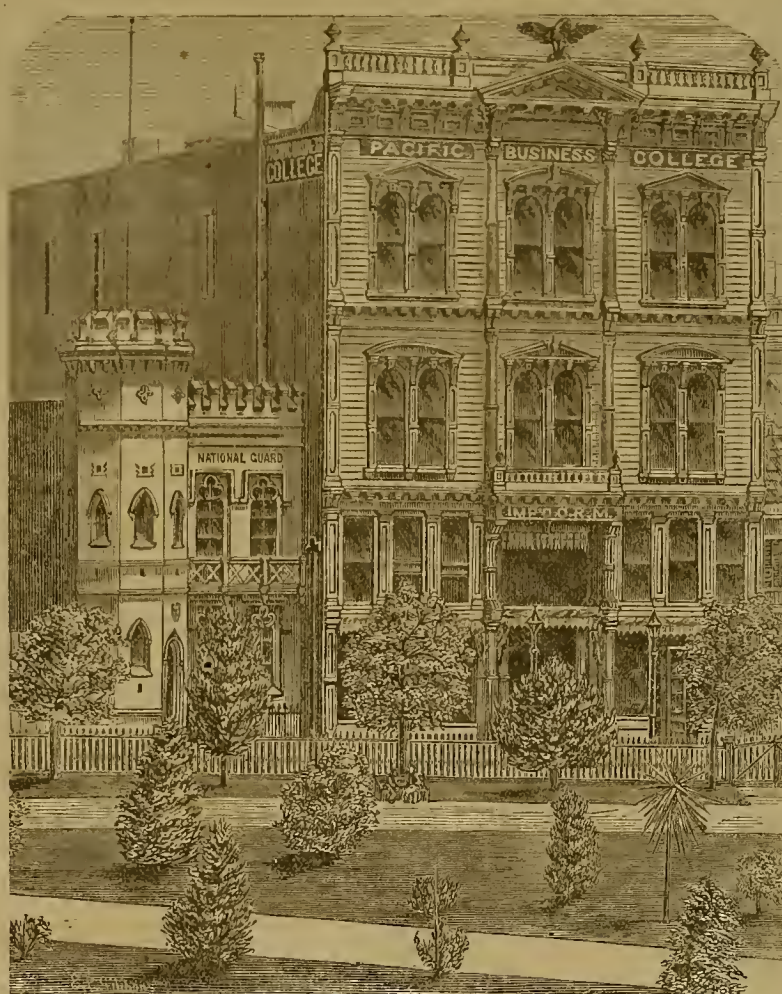
Notice is hereby given, that a certified copy of the Assessment Book of the Real Estate which is subject for the payment of Principal and Interest upon "Dupont-Street Bonds," as directed by an Act of the Legislature of California to authorize the Widening of Dupont Street in the City of San Francisco, "Approved March 23, A. D. 1876," has this day been placed in my hands for collection. The Laws in regard to the collection of the same will be strictly enforced.

WM. FORD,

Tax Collector of the City and County of San Francisco.

J. H. HODGSON

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We offer this season many new improvements that must be seen to be appreciated, therefore buyers coming to San Francisco are invited to examine our stock—THE LARGEST IN THE CITY.

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Deposits of bullion received, melted into bars, and returned made in from 24 to 48 hours.

Bullion can be forwarded to this Office from any part of the interior by Express, and returns made in the same manner.

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1. O. Address: ALAMEDA, CAL.

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MINING INTEREST FOR SALE.

For a small amount, in several claims on one of the

RICHEST LEDGES IN ARIZONA.

Money needed for development. The ore will pay a hand some margin to ship to the city. Apply at this office.

San Francisco Cordage Company.

Established 1856.

We have just added a large amount of new machinery of the latest and most improved kind, and are again prepared to fill orders for Rope of any special lengths and sizes. Constantly on hand a large stock of Manila Rope, all sizes; Tarred Manila Rope; Hay Rope; Whale Line, etc., etc.

TUBBS & CO.,

611 and 613 Front Street, San Francisco

Continued from page 5.

surances have been received from below that work will shortly be resumed.

The Black Jack is looking well, and turning out large quantities of rich ore.

Montana.

WEEKLY BULLION SHIPMENTS.—Butte Miner, Dec. 11: Owing to the suspension of work in the Dexter and Burlington mills in the latter part of last week, the shipments of bullion for the last seven days have not been very heavy. Altogether, from the different mills, and from Messrs. Smith & Kessler's arrastra, there was shipped by Wells, Fargo & Co's express, from the 10th to the 17th inst., 2,343½ pounds of bullion, valued at \$36,150, which is not so bad, being a little over \$5,000 per day.

SILVER.—New Northwest, Dec. 21: Mr. David Carson, Supt. of the Hope M. Co., Phillipsburg, brought up this week 13 bars of silver. Weight, 1,030 pounds—value, \$17,000. This with the nine bars—value, \$3,000, aggregating \$20,000—constituted the November run of that mill. Everything is running well at the Hope.

Oregon.

MINING PROSPECTS.—Oregon Sentinel, Dec. 26: Very little rain has fallen in this section this winter, and our mining population is mostly idle, anxiously waiting for the commencement of the rainy season. The miners are all ready for work, and will begin active operations as soon as they have sufficient water, but the prospects for a very prosperous mining season are not as flattering as they might be.

LUCKY QUEEN.—We are informed from a most reliable source that the owners of the Lucky Queen mine have very great cause to rejoice. From late developments it seems to be established to the satisfaction of those interested that the main ledge has at last been reached, and that the prospect is flattering indeed. It seems that the work heretofore has been prosecuted in the wrong direction, and, consequently, without avail; but a few days ago the work was placed in charge of another Superintendent, who, from his extensive experience in such business, determined to take another course from that of his predecessor, and was rewarded in a very short time by finding only a short distance below the surface, strong indications of that which he was seeking, and has finally struck what, in past experience in quartz mining does not fail, is a large, abundantly rich, and well-defined ledge. This will add another and, we doubt not, permanent attraction toward the rapidly developing mines of southern Oregon. The efforts of this company certainly deserve success, and our best wishes are with them.

Utah.

PARK CITY.—Cor. Salt Lake Tribune, Dec. 29: Two or three important developments have taken place recently in as many old mines, or rather prospects, that have been hitherto neglected. Large bodies of ore, which have been found as yet of low grade, but deeper in the hill, with first-class indications of something better below or further back in the hill. It is too soon yet to announce these discoveries, so many false alarms have been given that we wish to be certain of a great success before we cackle any more. Experience has taught us that we must gain a certain depth below the surface before anything permanent can be expected. Why this is so, it would take too long to explain in a brief letter. If two or more good mines are not developed very soon, then I shall be much disappointed and mistaken, but it will not be the first time and won't kill me.

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING DECEMBER 11TH.

WELL BORING MACHINERY.—J. Bendersheldt, Anaheim, Cal.
THE MANUFACTURE OF CARINET JEWELRY.—W. A. L. Miller, S. F.
BRAIDING MACHINES.—F. Whelan, S. F.
NET LOCKS.—H. D. Rock, Eureka, Nev.
SCREW WRENCHES.—E. T. Barlow, S. F.
MEANS FOR REMOVING AND DESTROYING SEWER GASES.—S. J. Corbett, Los Angeles, Cal.
SILVER FURNACES FOR SMELTING TAILINGS AND CONDENSING MERCURY.—G. R. Evans and W. F. Prescott, Carson City, Nev.
FIRE BRICK COMPOUNDS.—G. R. Evans and W. F. Prescott, Carson City, Nev.
OVERALLS.—Henry S. Flood, S. F.
THE MANUFACTURE OF SODA FROM ITS SULFATES.—F. Gutzkow, S. F.
BED LOUNGES.—F. Jensen, Seattle, W. T.
LAVER BRUSH ROSETTES.—P. Lyttleton, Austin, Nev.
PIPE COUPLING AND JOINT.—E. T. Stein, S. F.
CLOTHES CHAMPS FOR BEDSTEADS.—F. Woodward, Sacramento, Cal.

RE-ISSUES.

CONCRETE PAVEMENTS.—R. Skinner and B. Bonnet, S. F.
CONCRETE PAVEMENTS.—R. Skinner and B. Bonnet, S. F.

TRADEMARKS.

WHISKY.—Anson P. Hotelling, S. F.

The patents are not ready for delivery by the Patent Office until some time after the date of issue.
NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

AIR BRAKE.—H. W. Green and G. W. Hoag, Jacinto, Colusa Co., Cal., and T. P. Cleveland, Mountain House, Sierra Co., Cal. The patent covers an improved automatic arrangement for connecting and disconnecting the air pipes of a railway air brake between the cars of a train, so as to avoid the inconvenience of coupling and uncoupling them by hand, and the liability of their being negligently left uncoupled. The invention consists in attaching a supplemental spring bumper to the truck at each end of every car, where it will not be affected by the varying height of the car body. These bumpers project out somewhat further than the ordinary drawhead bumpers, so that the opposing ends will come together and be tightly compressed

before the ordinary bumpers are connected. The heads of these supplemental bumpers are chambered out and provided each with a valve, which remains closed when the cars are disconnected, but which is opened automatically by the meeting of two bumpers. The air pipe of the air brake is then connected with the chamber in this bumper head, so that the connection of the air passages will be automatically completed when the cars come together and are coupled.

RAILWAY AND CONDUIT.—Jno. B. Ward, S. F. This invention consists in an arrangement of water pipes, conveying water for irrigation or other uses in combination with an ordinary railway for transportation purposes. On the usual ties, pipes are laid. The rails are curved to fit the top of the tubes, and are secured in place by chairs fitted for the purpose. The ties have concave grooves for receiving the pipes, cut at both ends. The distance between the rows of pipe will conform with the gauge of the road. The pipes consist of an inner and outer tube, or binding rings. The inner tube is formed of staves in lengths of any suitable material, so placed as to break joints at the meeting ends. The inner pipe is inclosed by an outer tube or mask of iron. The inventor claims that the combination of pipe and track on the same road bed is of advantage in many ways. The pipe as a support for the rail is continuous and elastic, greatly reducing the danger of accidents from broken rails, and furnishing a smooth roadway. The water pipe by being laid on a graded road bed loses less head and force of water than by the usual way of laying pipe. Any break that may occur is easily found and quickly reached for repairs.

MOWING MACHINE ATTACHMENT.—Samuel Spencer, Turlock, Stanislaus Co. This invention is a novel device to be used in connection with the ordinary sickle of a mowing machine, for the purpose of separating the cut from the standing grass, when the machine is working in fallen or tangled grass or grain the attachment is operated by the same pitman which operates the mower sickle. In mowing tangled grass or grain, especially alfalfa, where only the usual sickle is used, the standing grass being entangled with that which is cut, remains matted together so that no indication is left where the cut grain leaves off and the standing grain begins. This invention consists of a short, upright sickle attached to the outer end of a yoke-shaped frame which extends upward and over the ordinary sickle. This upright sickle makes a vertical cut at the outer end of the ordinary sickle so that the cut grass is completely severed from the standing grass, and the driver of the mowing machine can always tell where to run the sickle so as to cut standing grass.

LIGHT WEIGHT ROPE.—Alfred D. Laedy, S. F. The object of this invention is to provide a rope which will be large in diameter and, at the same time, light in weight. It often happens that rope of large diameter is desired when a much smaller rope would be sufficiently strong; such is the case for instance in supporting painters scaffolds from buildings. A small rope would have sufficient strength to sustain the weight of the scaffold, and the weight of the persons who stand upon it, but it is painful and tiresome for the painters to hoist the scaffold with a small rope, when it would be but a simple task if the rope was of twice the diameter. The improved rope is intended to supply such demands, and it consists of a hollow rope filled with cork or other light flexible filling or stuffing so as to provide the necessary qualities, viz., lightness, increased diameter and the requisite flexibility.

STONEWARE KILN.—Chas. Gladding, S. F. This invention relates to certain improvements in the construction of stoneware and pottery kilns. It consists of a novel method of utilizing the waste heat from the downward draft pottery kiln, and an arrangement of secondary furnaces in a waste heat kiln, which are to be fired after the first kiln is burned off in order to complete the burning of the secondary or waste heat kiln. It also consists in the employment of certain dampers whereby the heat is regulated and the charged secondary furnaces are prevented from burning until desired, and by which all ingress of cold air to the kiln is prevented while these fires are being lighted.

WINDMILL.—R. R. Lander, Turlock, Stanislaus Co., Cal. This invention relates to certain improvements in windmills and regulating devices. There are two vanes, one of which is intended to lie flat and present but little surface to the wind, while the main vane is vertical and holds the wheel to the wind, but when the small vane is turned up the main vane is laid flat. These movements are made together. While the wind blows with moderate strength the main vane will hold the wheel into the wind, but as it increases beyond a certain point it turns a small side vane, which, by appropriate mechanism, allows the wheel to be turned from the wind.

WELL BORING APPARATUS.—W. W. Vaughn and S. Jackson, Stockton. This improved apparatus for boring wells and other holes in the ground consists, first, of an improved arrangement for feeding and forcing the boring apparatus into the earth; second, of a novel arrangement

for hoisting the loaded cylinder to the surface and discharging its contents; third, of a device for steadying and bracing the crowding rod or shaft which drives the auger into the earth; and fourth, of a device for forcing the curbing down the hole as the boring progresses; all compactly arranged and easily operated.

News in Brief.

INDIANS have started on this war-path in western Texas.

THE Hon. Nathan Coombs, the founder of Napa, is dead.

THERE was taken to China in treasure from here in 1877, \$17,601,273.

A NEW tariff bill is being diligently prepared, and will be reported after the recess.

SEVEN vessels and 37 men were lost by the Gloucester fishing fleet the past season.

AN average of five carloads of wheat per day are now arriving at Long wharf, Oakland.

THE Collateral Loan and Savings Bank, of this city, has filed a petition in bankruptcy.

THERE were 2,937 marriage licenses issued in this city in 1877, and 243 divorces granted.

THE French Government has requested Don Carlos to leave France. He started Thursday.

IT is stated that Bismarck is trying to break up the French exposition by some diplomatic movement.

THE weather has been unusually cold for the past week. Ice, three-eighths of an inch thick, formed in Oakland on Wednesday morning.

OUR police forces made 19,262 arrests during 1877, and the Police Court fines amounted to \$23,276.

THE Commissioner of Internal Revenue is opposed to any change in the tax on whisky and tobacco.

A CRAZY man threw himself under the wheels of the San Jose train last week and was crushed to death.

NEW law suits, civil, were instituted in this city in 1877 to the number of 3,969, the Court fees being \$60,831.75.

THERE are less than 2,000 acres of Government land in Iowa and the Sioux City land office has been discontinued.

THE debts of the Pioneer Bank, thus far ascertained, amount to over \$800,000, divided among 1,150 persons.

THE notorious Northampton bank robbers, Scott and Dunlap, have each been sentenced to 20 years in the State prison.

THE American ship *Nimhis*, with wheat from Portland to Cork, was lost off the Columbia river bar the first day out.

THE Internal Revenue receipts during 1877 amounted in San Francisco to \$1,933,752.46. The Custom duties were \$6,692,432.56.

IT is rumored in New York that this Bank of Nevada contemplates establishing its own agencies in New York, London and Paris.

COURTNEY challenges any oarsman in the United States or Canada for any amount and the championship of America—the race to be rowed prior to the Trickett match, in July next.

OVER \$53,000,000 has been paid out by the United States Treasury in the past six weeks, the greater portion to officers and men in the army.

A DISPATCH from Yokohama says: Japan has renounced all commercial treaties and resumed the right to revise her custom duties at pleasure.

A DISPATCH from Washington states that the law officers of the Department of the Interior are making detailed examination of the operations of the desert land grabbers.

EXPERIMENTS are being carried on in Prussia, by order of the German military authorities, to determine how far it may be practicable to employ the telephone for military purposes.

THE Senate Fish Committee, the Fish Commissioners and a committee of fishermen have met in Canada, to discuss matters connected with the salmon of the Sacramento river.

A NUMBER of wealthy gentlemen have bought the large conservatories imported from England by the late James Lick, and sold as part of his estate, and presented them to the city to be erected in Golden Gate park.

CHIEF ENGINEER SCANNELL, of the San Francisco fire department, was run over and had his collar bone fractured while on the way to a fire on Saturday.

W. Y. JOHNSON, formerly of Oregon, is now at Valparaiso, Chile, and writes that common laborers receive but 50 cents per day, and skilled labor ranges from \$1 to 1.50 per day.

A BLIND Italian beggar brought suit in the County Court last week to recover \$100 and during the trial it came out that the plaintiff had \$1,000 to his credit in the savings bank.

REPORTS received at the Department of Agriculture indicate that the wheat crop of this country for 1877 was about 360,000,000 bushels, or 50,000,000 bushels greater than for any previous year.

TEN men, convicted of riot in interfering with mining operations last August, have been sentenced at Wilkesbarre, Pa., to pay fines varying from \$10 to \$100 and imprisonment of from 30 days to nine months.

THE track for the Dumbarton railroad is being laid on the Alameda marsh, near the bay. Piles are being driven for the wharf, and, before long, construction trains will run over the Alameda end of the road.

THE Western Union and the Pacific division of the Atlantic and Pacific telegraph lines have consolidated. Atlantic and Pacific telegraph offices on this coast have been discontinued, except at railroad station.

THE Branch Mint in this city is in operation. There were 243 divorces granted in this city during the year.

THE value of real estate in Alameda, is set at \$36,389,961.

SACRAMENTO has a commercial business of \$25,496,269 in 1877.

A TRANSIT of Mercury over the sun's disc, takes place May 6th.

THE five cent fare system was inaugurated on our street car lines on New Year's day.

DR. JACOB B. DEMAREST, committed suicide at his office in this city this week.

THE Russian Generals have been directed to accept a truce when asked for.

THE attack on Erzsroum is to be delayed until the end of this month.

THE old Bulls-Head Bank, of New York, is about to retire from business.

BURGLARIES and robberies are becoming alarmingly frequent in San Francisco.

THE net gain of San Francisco in population by emigration hither in 1877 was 17,293.

THERE were 5,503 deaths in the city in 1877, of which 3,386 were males and 2,117 females.

AN old man was attacked by hoodlums, and shot dead at an early hour on New Year's day.

RUSSIA has secured a large number of locomotives from manufacturers in Paris, France.

A COMMISSION is to be appointed to investigate the border troubles on the Rio Grande.

SUPERINTENDENT of Construction Welsh, of St. Louis, has been removed by the President.

THE yield of this precious metals of the Pacific States and Territories for 1877 was \$98,421,754.

H. L. DODGE has taken the place of O. H. La Grange as Superintendent of the U. S. mint in this city.

THE clerk of the Police Court of this city has been arrested on a charge of embezzling about \$5,000.

THE contractors of this Brazil railroad will not be allowed to employ colored men in the construction of it.

THE Harbor Commissioners report that 13,425 feet of the new sea wall for the city front will cost \$4,362,086.

PROPERTY in this city worth \$997,396.98 was destroyed by fire last year, the insurances on the same being \$2,098,679.92.

THE situation on the Caffre frontier (Africa) is very dangerous and troops are being sent from England to Cape Town.

Signal Service Meteorological Report.

Week Ending January 1, 1878.

HIGHEST AND LOWEST BAROMETER.						
Dec. 26	Dec. 27	Dec. 28	Dec. 29	Dec. 30	Dec. 31	Jan. 1.
30.24	30.18	30.11	30.17	30.19	30.13	30.26
30.16	30.09	30.07	30.07	30.13	30.13	30.20
MINIMUM AND MAXIMUM THERMOMETER.						
52	52	52	53	53	52	52
47	45	48	46	44	42	43
MEAN DAILY HUMIDITY.						
79	88	81	63	67	71	52
PREVAILING WIND.						
N	N	E	N	N	N	N
WIND—MILES TRAVELED.						
94	60	97	181	93	90	162
STATE OF WEATHER.						
Clear.	Fair.	Rainy.	Clear.	Clear.	Clear.	Clear.
RAINFALL IN TWENTY-FOUR HOURS.						
		.36				
Total rain during the season, from July 1, 1877, 4.90 in.						

Testing and Working Silver Ores.

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has just been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope:

Under the heading of the first chapter, "Testing Ore for Silver," we find paragraphs on ore formation test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working same, applications for testing, roasting, etc. Under the heading of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protoclauride of copper, use of copper and iron, quantity of chemicals, carbonate of lime chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the heading of "Leaching Processes" are the titles, Smelting, Mexican process, Chilean process, Kroehnke's process, etc. Under "Pulverizing Machines" are described the arrastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for roasting a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

The book is a serviceable one for miners and prospectors' use. Price, post free, \$2.00. Address Dewey & Co., MINING AND SCIENTIFIC PRESS, 202 Sansome Street, San Francisco.

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(From Pacific Rural Press of Dec. 22, 1873.

OUR PLATFORM.

It is the aim of the publishers to make the PACIFIC RURAL PRESS a vital force in the agricultural development of the Pacific coast. In those methods of practice which secure widest success; in the introduction of cultures which are adapted to our varied conditions of soil and climate; in extending a knowledge of the true science of agriculture, the RURAL PRESS is granted position as a leader, nor do publishers nor editors arrogate to themselves special credit for the proud place which our journal occupies, except as it may be in part the result of their devoted and unremitting labor. For the elements of experience and practical research, in which our columns are rich, we gladly acknowledge our indebtedness to the noblest band of

Correspondents and Contributors

Which any agricultural journal in the world can muster. They dwell in every part of the coast. They are practically engaged in every special branch of agriculture. They are leaders in these branches, by virtue of their own successes. They are men and women who are ever ready to act upon their convictions, that by a comparison of practices and experience, each can aid the other with such timely and valuable information as each gains from his daily work and study. They respond quickly and definitely to all points which arise for elucidation, and thus they make the RURAL PRESS, each week, a compendium of information concerning Pacific coast agriculture, an encyclopedia of the freshest facts and experiences, a treasury of valuable agricultural truth, such as cannot be found in any other journal in the world.

The qualities which we have mentioned as characteristic of our correspondence and contributed articles are those chiefly aimed at in our

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We have no luteost to serve save the true advancement of all our readers in all things which unite to secure the truest manhood and the widest success in the field of industry in which they are engaged. We pander to no debasing sensations. We give expression to no sentiment except it be ennobling and elevating. In our search for topics for editorial comment, we glean the whole available field of literature and experience for themes which are fresh and of direct bearing upon the improvement and extension of our agricultural resources, and readers may look to our columns for lessons drawn from progressive agriculturists everywhere.

In this work we spare no pains nor expense, within our means, to enrich our journal with instructive

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Illustrative of the achievements in breeding of cattle and horses and other farm animals, the introduction of new fruits and trees, the latest improvements in designing and constructing agricultural buildings and rural homes, the beauties of landscape gardening, the fine arts of grafting and propagating; in short, in all lines of progress in which the engraver can aid the writer in the presentation of valuable facts and ideas. All who read our journal concede our marked superiority in the fitness and value and excellent printing of our illustrations.

The matter which is deemed worthy to be brought to the attention of readers is edited

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One of the secrets of modern progress in science and industrial art is the system of arrangement and classification of knowledge which has prevailed. This system we find of the highest value in our editorial experience. Each of the departments of agriculture, The Stock Yard, The Dairy, The Vineyard, Horticulture, Floriculture, Arboriculture, The Apiary, The Stable, The Swine Yard, The Poultry Yard and other special branches, are each made the subject of special study and research, and thus facts most important to the success and progress of each, on this coast, are brought forward.

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Is looked upon by the editors of the RURAL PRESS as a pleasant field in which their best and most valuable work can be accomplished. To instruct without wearying; to entertain without demoralizing; to amuse without engendering coarseness; to promote true sentiment, lofty and ennobling emotions—in short, to aid all readers toward the attainment of a higher manhood and womanhood and thus make life more and more a joy and a value, is our constant aim in the careful selection of reading for our Home Circle columns.

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Pleases the tiniest birdlings of the flock with its woe stories and funny pictures, and once in a while gives wholesome lessons to their older brothers and sisters.

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The RURAL PRESS holds a leading place in the modern movement to instill among all workers the need of a

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In Domestic Economy.

Which underlies all the economies, the RURAL PRESS extends a helping hand to the housewife and thinks no effort too burdensome which promises to aid her in her arduous work in the kitchen, the dining-room and in the general care of her household.

We believe that the success of the farmer lies in selling wisely, no less than in producing well. Hence

Our Market Review

Is prepared with the utmost care, and no pains are spared to make it fairly and truly reflect the state of the markets. Our quotations are drawn from actual transactions (unless we state expressly that a thing is given as a rumor), and we cite special sales in all cases that we can obtain them. Thus not only do we give each week a schedule of rates at which farm produce is sold and farmers' supplies bought, in this market, but we are always on the lookout along all avenues of information for facts and tendencies which promise to influence the trade in special articles in any way. We claim to keep our readers fully informed of the leading and important trade news, which affects their interests, and we have so far succeeded in winning the confidence of readers that the quotations in the RURAL PRESS are made the basis of transactions in many parts of the interior. We esteem this department of our paper of such great importance that we do not relegate it to reporters but hold it as strictly editorial work, that we may be personally sure of its accuracy and trustworthiness.

Improvement of the "Rural Press."

Our readers assure us that each volume of the RURAL PRESS is better than the preceding one. This is our ambition for the paper. Agriculture on this coast is advancing from the early chance methods and results to the enlightened systems which result from wider experience, fuller investigation and experiment, and the application of scientific truth. As the RURAL PRESS leads in this advancement it bears the mark of it upon its own countenance. We have been able to improve our journal in many ways and to do this the publishers have freely applied the revenues of the paper to its own improvement. They regard it as no temporary enterprise for immediate profit, but are proud to build it up as one of the institutions of the coast, confident that their honor and reward will be greater, even though it be deferred. This policy has both improved the journal in its mechanical departments and has secured the highest editorial intelligence and skill which can be found in this specialty of literary work. By such efforts to improve the RURAL PRESS, the publishers have more than returned the value which subscribers expected when they first bestowed their patronage. This we still expect to do, and the wider our circle of readers becomes the better paper we can send to each. Thus our course is onward, and thus we feel a claim upon the co-operation of all readers in the further building up of our journal.

The Field of the "Rural Press."

Although our first and chief devotion is bestowed upon the agricultural industry of this coast, and here dwell the great mass of our readers, we have groups of subscribers in such widely separated parts that we may fairly claim a world-wide audience. The topics which are presented in our columns are so charged with fresh experiences that they win the attention of agriculturists everywhere. Men who are prominent in progressive agriculture in the Eastern States rank the RURAL PRESS among the first of the journals of its class in this country. In Great Britain and on the continent of Europe, among foreign residents in East India, China and Japan, and in the newly opened world of Oceania, the RURAL PRESS counts its firm friends, and is proud of its ability to interest them and aid them in their work.

Why We Succeed?

The reasons of the gratifying growth and extended influence of our journal are not difficult to determine. First, by the constant co-operation of our readers we are able to make the RURAL PRESS an acknowledged representative of the agricultural interest on this coast. This is of itself a key to success, and it unlocks to us the doors to favor all over the world, for no narrower than this is the fame of our agriculture. Second, we hold the friendship of our patrons everywhere by the freshness and practical value of the matters which we present for their consideration. Third, we win the respect of all truly progressive men because, though ever on the alert to battle on the side of progress, we are never entrapped into worship of the glittering tinsel of the sensational. Our policy is to strive untiringly for better knowledge and elevated practice, but never to let go that which is good, until a better thing is demonstrated. Thus our policy may be defined as a resolute, but yet open-eyed conservatism. This we believe is the only true policy where great industrial interests, and all they involve, are at stake. Fourth, we never abuse the welcome which we gain to the homes of our readers by allowing our columns to carry the specious baits of quacks, confidence men and swindlers. They would pay us roundly for the opportunity to gorge themselves upon our unsuspecting patrons, but the idea is abhorrent to us. We can build up a truer and prouder success without their gold. Fifth, the grand secret of our success lies in the word work, enthusiastic, delightful and yet unceasing work for the success of the PACIFIC RURAL PRESS and all those who come within the circle of its influence.

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UNITED STATES

Mineral Land Laws, Revised Statutes, AND INSTRUCTIONS AND FORMS UNDER THE SAME.

We have just issued a pamphlet containing the General Mineral Land Laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with Instructions by the Commissioner of the Land Office; Mining Statute of July 25th, 1836; Mining Statute of July 9th, 1870. Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Registers' Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Charge of Fees; Proof of Ownership and Possession in Case of Loss of Records; Mining Records; Affidavit of Citizenship; Certificate that no Suit is Pending; Power of Attorney; Protest and Adverse Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, post-free, for 50 cents. It would be in the hands of every one having any mining interests. DEWEY & CO., Publishers of the MINING AND SCIENTIFIC PRESS, S. F.

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To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where the principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

California Fruit Growing Assoc'n.—Principal place of business, San Francisco. Location of property, El Dorado County, Cal.

Notice is hereby given that at a meeting of the Board of Directors, held on the twentieth day of December, 1877, an assessment of two (\$2) dollars per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at 331 Sansome Street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the twenty-second day of January, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the ninth day of February, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

HORACE JONES, Sec'y

Office, 331 Sansome Street, San Francisco, Cal.

Manzanita Gold Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Sulphur Creek, Colusa County, Cal.

Notice is hereby given that at a meeting of the Board of Directors, held on the third day of December, 1877, an assessment (No. 1) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, No. 51 Fremont Street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the eighth day of January, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Thursday, the thirty-first day of January, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, GEO. S. SPRATT, Sec'y.

Office, 51 Fremont Street, San Francisco, Cal.

New Basel Consolidated Gravel Mining Co.—Principal place of business, San Francisco, Cal. Location of works, Placer County, Cal.

Notice is hereby given that at a meeting of the Board of Directors, held on the tenth day of November, 1877, an assessment of seven (7) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, 610 Merchant Street. Any stock upon which this assessment shall remain unpaid on the twenty-eighth day of December, 1877, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the fourteenth day of January, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, D. F. LUGAY, Sec'y.

Office, 610 Merchant Street, San Francisco, Cal.

South Overman Consolidated Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Gold Hill, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the twenty-sixth day of December, 1877, an assessment (No. 2) of twenty-five (25) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, 328 Montgomery Street, Room 21, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-eighth day of January, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the eighteenth day of February, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, DAVID WILDER, Sec'y.

Office, 328 Montgomery Street, Room 21, San Francisco, Cal.

Summit Mining Company.—Location of principal place of business, San Francisco, California.

Location of works, Mineral Point Mining District, Plumas County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the tenth day of December, 1877, an assessment (No. 1) of five (5) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, 418 California Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the twenty-first day of January, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the twenty-sixth day of February, A. D. 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, J. W. CLARK, Sec'y.

Office, Room 2, No. 418 California Street, San Francisco, Cal.

Timmy Chub Mining Company.—Location of principal place of business, San Francisco, California.

Location of works, Cornish Mining District, Los Angeles County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the fourth day of December, 1877, an assessment (No. 1) of fifty cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 25, Nevada Block, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the fourth day of January, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the twenty-first day of January, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, G. O. PRATT, Sec'y.

Office, Room 25, Nevada Block, San Francisco, Cal.

The Welch Consolidated Quicksilver Mining Co.—Principal place of business, San Francisco, Cal.

Location of works, Mount Diablo Mining District, Contra Costa County, Cal.

Notice is hereby given that at a meeting of the Board of Directors, held on the fifth day of December, 1877, an assessment (No. 1) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 7, No. 420 Montgomery Street.

Any stock upon which this assessment shall remain unpaid on the seventh day of January, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the twenty-sixth day of January, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

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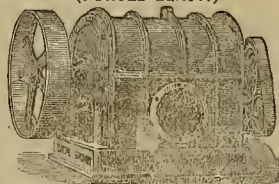
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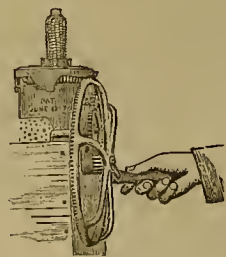
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SAN FRANCISCO, SATURDAY, JANUARY 12, 1878.

VOLUME XXXVI.
Number 2

Smelting Fine Ores and Tailings.

Geo. P. Evans and Wm. P. Prescott, of Carson City, Nev., have patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a smelting furnace and condensing attachment for melting fine ores, without subjecting them to any preliminary preparation, such as converting them into bricks, by mixing them with an adherent substance, as has been necessary. The furnace is an upright or stack furnace with the usual fire-brick linings, the body being made double, so as to form a water-jacket entirely around the furnace, into which a constant circulation of water is maintained through a pipe at top and bottom. The furnace is made in a double-cone shape, that form giving a large fire surface and concentration of the ascending volume of heat. The fire-grate, ash-pit and tuyere-pipe are as usual. A passage leads downward from the center of the ash-pit, through a short pipe at the lower end of the furnace, and conveys the melted metal into a crucible.

The door, through which fuel is supplied, is a considerable distance above the grate, so that when the fuel is introduced it will fall upon the burning fuel on the grate. A large cylinder is mounted horizontally upon a suitable support opposite the upper end of the furnace. This cylinder serves as a flue and condenser both. The top of the furnace is closed tightly by a cover, from the center of which a curved pipe leads into the end of the cylinder and serves to conduct any fumes generated in the furnace, together with the products of combustion, into the cylinder.

Each end of the large cylinder is closed by a head, similar to a boiler-head, and a pipe leads from the center of the top of the furnace and enters the cylinder-head. Inside the cylinder are secured two partition-plates or flue-sheets, one near each end of the cylinder, thus dividing the cylinder into three compartments, the middle one of which occupies a greater part of the cylinder. These sheets are connected by means of one or more flues or pipes passing through the middle compartment, but communicating with the end chambers. A vertical pipe passes up through the bottom of the cylinder and is connected to each of the flues by a T-coupling.

Water is admitted into the middle compartment through a pipe above one end of the middle compartment and is allowed to escape through a pipe at the bottom of the cylinder, near the opposite end of the compartment, so that when the furnace is in operation, a continuous circulation of cold water can be kept up through the chamber, for the purpose of condensing the fumes which attempt to pass through the flues. A smoke-stack or draft pipe is connected with the outer compartment of the cylinder.

The process of smelting fine ores and tailings consists in feeding them into the upright or stack furnace, at some point near its upper end, and allowing them to fall through the upward ascending flame and heat and drop upon the burning fuel on the fire-grate. To this end, therefore, the feed-opening is near the top and at one side of the furnace. The fuel falls upon the grate, while the blast from the tuyere creates an intense heat inside of the furnace. As the heat and products of combustion rise upward towards the curved flue, the fine ore or tailings is showered by means of an automatic

feeder through the opening and descend, through the upward rising heat until it falls upon the burning fuel, where the metallic portion soon becomes smelted and runs off through the short pipe into the pot or crucible.

In smelting pulverized or fine ore, the condensing attachment need not be used unless the ore contains some metal which gives off vapors which it is desired to recover. But the chief use of the condenser is when tailings are being smelted. Tailings almost always contain a large percentage of quicksilver that escaped in the original treatment of the ore, from which they are derived. Therefore, when the fumes from the tailings pass through the curved pipe, they enter the first chamber of the cylinder. This is a dust-chamber, where all that portion of the fine ore, whose specific gravity has not been sufficient to carry it downward against the upward draft, will settle and be caught. The lighter and more volatile portion, together with the metallic fumes and products of combustion

The Cope & Maxwell Mining Pump.

We illustrate on this page the Cope & Maxwell plunger pump, which is peculiarly adapted for mining purposes. This pump was arranged expressly to meet the wants of the deep mines on the Comstock, as auxiliary pumps in the inclines, winzes and the lower levels, for which work it has superseded other direct-acting steam pumps. The plunger works in soft packing and lasts a long time; moreover, it does not require to be an exact fit to the pump cylinder.

The pump has only been introduced within the past two years, but its success as a mining pump has been somewhat remarkable. The following mines on the Comstock are now using from two to four of these pumps: Yellow Jacket, Belcher, Crown Point, Justice, North Con. Virginia, Gould & Curry, California, and

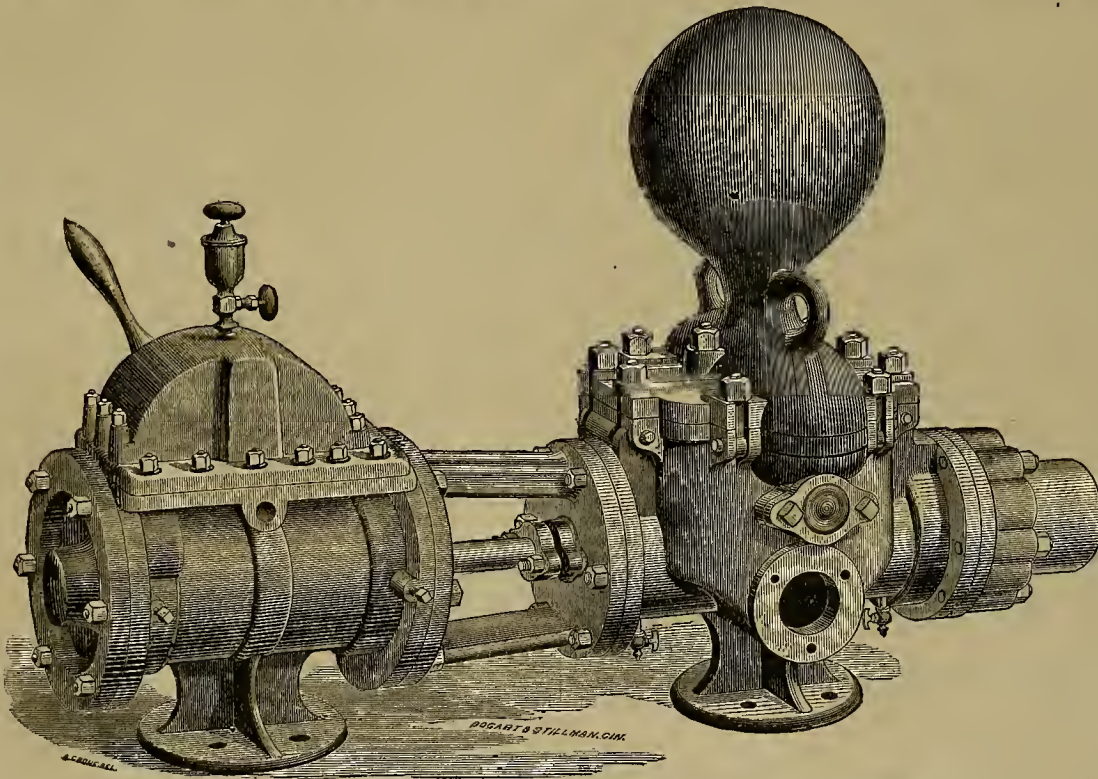
No Mining Board for Chicago.

Dispatches from Chicago state that the people there are losing faith in the project of a mining stock board. At the meeting held on Monday night for organizing the board, no results were accomplished worth mentioning. It is said that the characters of one or two men who are most interested in it is enough to condemn it and to secure general opposition to its establishment. Some New York and Western agents have been active in getting it on foot, but their efforts appear to be fruitless. It is charged that it will be established, if at all, simply for stock gambling and not for legitimate business.

This is exactly the view of the matter that occurred to us when the idea was first started some months since, and we took occasion at that time to remark that if the Chicago people wanted to invest in mines for legitimate mining purposes, they could accomplish the object better by not having any stock board at all. If they wanted to go into gambling in mining stocks, the move was all very well; but as far as real mining work is concerned, there is not the slightest necessity of a board for carrying it on. The board is simply a place where stock can be bought or sold by paying commission to certain men who, by paying for a seat, have acquired a right to sell or buy for others. These are the men who make all the money, for they have a sure thing of it both ways, selling and buying.

There are so many evils connected with the buying and selling of mining stocks, that they have covered up the good points almost entirely. Here, where we have had the most experience in the business, the Legislature is even now discussing methods and devising plans to prevent the evils which are the outgrowth of the system. People in the East hear of immense fortunes made in our stock market, but they do not hear of the disastrous consequences which befall so many who enter it. Those who have made the largest fortunes, it must be remembered, are the ones who have had opportunities not open to the common run of men, of getting "inside" information and of manipulating the stocks one way or another. It must be remembered, moreover, that the large fortunes of the "bonanza kings," for instance, have been made from legitimate mining rather than from the fluctuations of stocks. The men of whom we heard a few years ago as having made monstrous fortunes from stock are now unheard of comparatively, and even the brokers are not the prosperous community they once were.

The buying and selling of mining stocks, as the system was inaugurated, was an excellent way of enlisting capital for mining operations; but, unfortunately, there are so many tricks and curious transactions connected with it, that the system has no longer the confidence of the public. Chicago can do very well without a mining board, for if it was intended only as a stock gambling arrangement, the citizens would have more money in their pockets at the end of the year without than with it. No business in the world holds out better inducements for profitable investment than mining, pure and simple; but stock dealing is not mining. If legitimate work is intended we should gladly see our Chicago friends make some investments here, but unless this is the case they are better off as they are.



THE COPE & MAXWELL PLUNGE PUMP FOR DEEP MINING PURPOSES.

will pass through the flues in the chambers. These flues being surrounded by cold water, the instant the metallic vapors enter them they will be condensed and precipitated and the gravity of the particles will cause them to flow down through the vertical pipes into a receptacle prepared to receive them, while the products of combustion pass on through the smoke-stack into the open air.

By this means the inventors claim to be able to smelt fine ore and tailings without preliminary preparation. The fine ore falling through the ascending draft and heat will become thoroughly oxidized, so that by the time it strikes the burning fuel it is ready to part with its metals, while the previous oxidation of the base metals will avoid any liability of its slagging. In treating tailings, the inventors prefer to subject them to a concentrating process before submitting them to the smelting process, as they can thus get rid of a large proportion of the worthless stuff. This preliminary treatment, however, is not a necessity.

THE Board of Engineers have approved Capt. Eads' work on the jetties at the mouth of the Mississippi and the Cabinet has decided that he shall receive the money appropriated by Congress upon compliance by him with the legal provisions.

others. The K. K. Consolidated, Navajo, and other "outside" mines are also using this machine.

The engraving represents a pump specially adapted for high lifts, and capable of handling from 10,000 to 25,000 gallons of water per hour with economy, with the use of either steam or compressed air. The pump is made of varied capacity and weight, according to the work expected of it. The Cope & Maxwell manufacturing company make all styles of steam pumps and water-works machinery, including the celebrated "Isobronal pumping engine," a description of which we shall soon give for the benefit of our mining readers and those having large quantities of water to handle. Parke & Lacy, No. 417 Market street, in this city, are sole agents for the Pacific coast.

RICKARD's patent oxidizing and chloridizing furnace, for roasting copper, silver and other ores, prior to leaching or amalgamating, is the newest metallurgical appliance. Mr. Rickard now offers it to the notice of the miners and mill owners of the Pacific coast with every confidence that it will fill a requirement long felt, either by the wealthy corporation or needy miner. This furnace can be put up cheaper than any in the market.

CORRESPONDENCE.

It is the desire of the editors of this journal to be liberal toward all correspondents, and therefore statements and opinions are frequently published, on the authority of the writers, for which we do not assume responsibility.

Calaveras County Mines.

EDITORS PRESS:—The Banner mine, formerly known as the Grassbopper, owned by A. J. Rhodes, Esq., and superintended by Col. J. W. Johnson, is now being systematically worked, and the richest kind of rock has been struck while sinking. The vein is about one foot in width, and shows free gold in large quantities. Under the present administration a new engine, capable of sinking 1,000 feet, and boilers have been placed on the mine, everything being in first-class shape. About 30 men are employed, and Col. Johnson, aided by Mr. John P. Spalding, has made a success of the undertaking.

The Blue Jay

Is the property of Potter, Spalding & Co. They have recently placed a whim upon their mine, and are running a full force of hands. Everything is lovely here, and is yielding as rich ore as ever. Their last crushing of about 50 tons paid over \$100 per ton. Hazard W. Potter, the locator of this mine, discovered another prospect on Christmas day, said to be exceedingly rich. The new discovery is located near the Banner hotel.

The Hortense

Owned and worked by Messrs. Lewis & Fairchild, recently crushed about 40 tons of ore, their first lot, which cleaned up about \$26 to the ton. They are still at work, and have plenty of the same kind of rock on the yard.

Peter Gass & Co.'s Mine

Was recently sold to San Francisco parties for \$3,000; terms, cash. Rock from this mine pays about \$13 per ton. About four tons can be taken out per day of two shifts (10 hours), two men each shift, one below and one at the windlass. Depth of shaft, 65 feet; J. J. Holmes, Superintendent, assisted by J. V. Toner.

The Valentine

Was in early days worked by Mexicans, and about 30 arastras were constantly employed in working its rock. It is estimated that several millions of dollars have been taken from the mine. Experts pronounce it to be as good as ever. This is a wet mine, and is now lying idle. Cause: want of funds to place machinery on the ground. Dave Lamson, owner.

The Grand Central

Main shaft is down about 130 feet; tunnel to tap the shaft, 300 feet; vein from four to six feet in width; rock low grade—about \$8 per ton—but lots of it. I will state here that rock in quantities can be worked for about \$2.50 per ton. Hoey & Toner are the owners. The mine is superintended by John L. Hoey, who was Superintendent of the San Bruno in its palmy days.

Harry Hausen

Has commenced operations on the old Richman mine, with flattering prospects, and also working his own claim, the "Glad Tidings," which pays \$70 per ton.

Hartwell & Co.,

Are now in San Francisco making arrangements for a new 30-stamp mill, and claim they will be able to crush rock for \$2 per ton. There are a great many of low grade mines in this vicinity, and a mill that will do this will be kept constantly employed. Monopoly has held its sway long enough here.

Holmes' Mine

Is worked by tunnel and is in about 400 feet, and still continues to yield good quartz. This mine has a good 10-stamp mill. J. J. Holmes, owner.

Times in Mosquito are looking brighter at present than for several years. A Philadelphia company and an English company are making arrangements for starting up some of the idle mines, and we are all looking forward for a bright future. The Banner hotel is crowded with guests, likewise the other houses. Hoey's saloon, at night time, puts us in mind of the days of '49. Garland's mill, of 18-stamp capacity, is running night and day. The two leading mines pay off from \$15,000 to \$20,000 monthly.

ONALD.

Mosquito Gulch, Calaveras Co., Dec. 31st.

The Alta Works.

In passing, we yesterday dropped in and spent a few minutes in looking through the Alta works. The first thing that will attract the attention of the mining man who visits these works is the splendid and powerful pumping engine. It is one of the latest style, geared directly to the bob, and works so smoothly and noiselessly that one hardly knows there is an engine about the place.

A peculiarity of the pumping apparatus of the Alta is that no balance hobs are used on the pump rod. Instead there are two rods. One comes up as the other goes down. The main shaft was yesterday 1,170 feet in depth, yet this arrangement of the rod or rods was working most smoothly and perfectly.

The rods are suspended upon a large pulley by means of a heavy steel wire cable. The

ends of this cable are securely attached to the rods which are thus suspended from the pulley—the pulley carries the weight of the rods. As greater depth is attained and a greater length and weight of pump rod is required, another pulley may be put in to sustain the additional weight.

The influx of water at the bottom of the shaft is not great, as it is only necessary to run the pump at the rate of two strokes per minute. It can be run up to eight or ten strokes per minute if required.

The new hoisting engine is working to perfection, and is sufficiently powerful to sink to the depth of 2,000 feet. The small engine—40-horse power—used until last Saturday, was yesterday being taken up and moved out of the works.

An air compressor is being set up and will be ready to go into operation to-morrow. It will be used to furnish air for an Ingersoll drill, which is about to be put up for work in the crosscut on the 1150-foot level. Heretofore all the drilling in the mine has been done by hand. The progress made will now be much more rapid. The compressor will also furnish air for a small engine, which will drive a small blower to furnish air in the underground regions.

A new carpenter shop is about completed at the south side of the main building. The building is 30x60 feet in size. A new blacksmith shop, 30x40 feet in size, has just been completed.

A new building is about to be erected at the east end of the present main building. It will take the place of the present main building from the galleys frame eastward. This new addition will be 34x62 feet in size, and from the floor to the peak of the roof will be 62 feet in height.

It has been found necessary to thus enlarge the main building, for the reason that a new hoisting frame, or galleys frame, 48 feet in height, is about to be put up. Work on these improvements will be commenced to-day.

When the changes and improvements now in progress have been made, the Alta works will contain the best and snugest outfit of machinery to be found on the lead, though not the most powerful. They will then be in a position to push work underground at a very rapid rate. They may not only vigorously prosecute the sinking of their main shaft, but may also push forward their prospecting operations on the 1150-foot level, and at levels below as fast as they are reached.—*Virginia Enterprise*.

NEW PUMPING ARRANGEMENTS.—The Manhattan company are making a change in the arrangements for draining their mines. Hitherto the South American shaft has been the pump shaft of the series of mines comprising the Frost and Curtis shafts and Allsopp incline, but the pumping works are to be removed to the North Star shaft. The South American is but 400 feet deep, while the North Star shaft extends to a depth of 600 feet. At present the water flows to the 400-foot level of the South American, whence it is pumped to the surface. When the pumping works are removed the water will be pumped from the 430-foot level of the North Star, which is equivalent to the 400 of the South American, but the arrangements will be such that the mines can be drained from the bottom by the North Star pumps should a large reservoir of water be encountered at the lowest depths of the Curtis and Frost workings; and the putting in of the pumping machinery in the North Star is a preparation against such a contingency. The North Star shaft has been entirely retimbered and is now in first-class order, and when the pumping machinery is removed to it the South American shaft will be practically abandoned, as it will no longer be of any benefit, and keeping it open would only be a useless expense. The improvements and changes made and being made in the Manhattan mines all tend towards concentration of labor, steam and machinery, and all useless works will be discarded.—*Reese River Reville*.

BEAUTY OF NATURE.—I am never more convinced of the progress of mankind than when I think of the sentiment developed in us by our intercourse with nature, and mark how it augments and refines our moral culture, and also (although this is not so generally admitted) with our scientific knowledge. We learn from age to age to see the beauty of the world; or what comes to the same thing, this beautiful creation of the sentiment of beauty is developing itself in us. Only reflect what regions lovely as Paradise there are over all Asia and Europe, and in every quarter of the globe, waiting to receive their fitting inhabitants—their counterparts in the conscious creature. The men who are now living there do not see the Eden that surrounds them. They lack the moral and intellectual vision. It is not too bold a thing to say that, the mind of man once cultivated he will see around him the paradise he laments that he has lost. For one "Paradise Lost," he will sing of a thousand he has gained. How every tender as well as every grand sentiment comes reflected back to us from the beautiful objects of nature! Therein lies their very power to enchant us. Nature is full of our own human heart. That rose—has not gentle woman leant over it, and left the reflection of her own blush upon the leaves and flowers? To the old man there is childhood in every bud. No hand so rude but that it gathers with the flower more and other beauty than what the dews of heaven have nourished in it.—*William Smith*.

The Gravel Mines of Nevada County.

From a trip to neighboring mining camps in Nevada county the Dutch Flat *Forum* gleaned the following items regarding the mines, their location, etc., some of which are paying well, and the others considered valuable on account of their locations, and are all receiving marked attention in being worked and prospected. Democrat hill, of which but little has been said through the *Forum*, is the upper or farthest north as yet of a series of mining claims located on an ancient channel, that if not the entire was certainly one of the main depositors of the auriferous gravel banks of Dutch Flat, as its course is left plain and traceable by the immense deposits of gravel that are now only disconnected in places by Bear river and Steep hollow, and run via Elmore bill, Liberty hill, Lowell hill, Remington hill to Democrat hill, a distance of 10 miles, running from north to south. This channel emerges from a mountain north of Democrat hill, and no doubt, is the outlet or continuation of the channel that passes through Omega and Washington. The deposits of gravel at this point are very extensive and also rich, out of which a great deal of money has been taken as early and as continuously since 1854, by means of drifting and working the shallow ground with pick, pan, rocker and sluice boxes. The principal mine at this place was purchased recently by a company from French Corral from F. Skeahan, who had the claim by purchase and pre-emption, which has a frontage of 1,200 feet, running parallel with the channel to the divide of the mountain, 1½ miles in length, and on which the depth of gravel will average about 400 feet. Several hundred feet of tunnels have been run recently by Mr. Skeahan for the purpose of opening up and working ground that will pay well for drifting, but we understand that the company now owning the ground intend to work it altogether by the hydraulic process.

This channel, on leaving the above mine, separates or forks, one branch still running south and the other in an easterly direction. The continuation of the latter which marks its short course to reach the north bank of Steep hollow, leaves a deposit of about 10 acres of ground, with an average depth of 150 feet, and is known as the Clipse mine. For a drift mine this is said to have been one of the richest ever worked in this section, but by which process it has ceased to pay. It is now owned by the Wick Bros., who have fitted it up for hydraulic, and out of which they expect to realize a large fortune.

To follow the course or father development of this branch of the channel brings us to the southern bank and divide between Steep hollow and Bear river, where another forking or separating takes place, but as yet little prospecting has been done at this point, although to judge from the extensive size of the increased branches would lead to the belief that they have been assisted in their development by another channel coming from the north. However one fork continued to extend in an easterly direction, leaving and reaching what marks its course a large deposit of gravel on the north bank of Bear river, known as the Kinder claim, where opposite and immediately below in the river was found the rich mines located on what is still known as Buffalo slide. Thus then mysteriously ended what still remains a secret, any further continuation of the fork or channel, as no tracings of it has ever been found in the lava beds which predominate opposite on the southern bank of Bear river. The other fork of this branch heads and hears south and again connects with the fork it separates from at Democrat hill in the Skeahan and Swamp Angel mines at Lowell hill. Nearly all of the mining ground lying north of the last named claims, on this divide, is covered by a patent, the property of Kinder, Gould & Co.

Returning to the starting point or southern fork of this main channel, as it leaves Democrat hill, the first mine we come to worthy of mention is the present much noted Wide West mine. When we say noted we do not mean it altogether on account of its richness, but partly on account of the singular formation connected with it. On either end is the Skeahan and Rhode Island mines, one with an average depth of 400 feet of gravel and the other 200 feet, and although the Wide West mine is the connecting link between the two, the bed of gravel found in it does not average three feet in depth, the balance of the deep surface being composed mostly of lava. But then, even with this limited amount of gravel, the Wide West is a valuable mine, and in it 26 miners find employment. Tunnel No. 1 has not been advanced any since our last mention. No. 2 is now 600 feet in length and a second drift opened to the east for the purpose of opening other breasts, when the force of miners will be increased. This mine continues to pay splendidly.

The Rhode Island mine is fitted up for hydraulic and the company are now anxiously awaiting the coming rains.

At Lowell hill several men are employed getting out timbers for the Jimmy hill mine.

Fourteen miners are employed in the drifts of the Swamp Angel mine. The main tunnel will be advanced, new breasts opened up and the force of miners increased as soon as enough rain falls to supply sufficient water to run the

air-blast to furnish the drifts with good air. The Angel as usual is paying well.

No gravel has been tapped in the Wild Cat mine yet, although the tunnel is in over 1,400 feet.

The Little York company's mines, at Liberty hill, are extensively fitted up for hydraulicing and will be put in active operation as soon as water can be had.

Mineral Wealth of Turkey.

The Grand Vizier is doing his best to create new resources, but he is nearly at his wit's ends. As a last expedient he proposes to lease the working of the coal mine at Heraclea, on the Black sea, in security for a new loan he is trying to negotiate. This mine produces a good coal, and as it lies near the sea there is but little difficulty in the transport of the coal. The Turks have never been successful in mining operations. They have but few men of practical science, and then there is so much rascality among their officers that there is but little net revenue from such undertakings. They are too jealous of foreigners to concede their mines to them. The empire abounds in mineral wealth of all kinds, particularly Thessaly, Bosnia and Asia Minor. On the slopes of Olympus in the vale of Tempe, an English company has for many years been engaged in mining operations, chiefly among the silver and gold deposits imbedded in the fanes of this rendezvous of the gods of Grecian fable. This is the only foreign company of any note that has been able to obtain a valuable concession in the mineral districts. Bosnia abounds in copper, lead, zinc, silver and iron of the first quality. Should it fall into the hands of Austria, as it is likely to do in the settlement of the Eastern question, it will prove a source of great wealth to that government. It is the opinion of a celebrated Russian scientific writer, who explored Asia Minor in detail some 10 years ago, and who published the results of his survey, that the sands of the Pactolus, if properly worked, would afford from the accumulated deposits it has piled upon its shores, a rich yield of gold, if not as great as it did to Croesus, yet in quantities that would astonish the world. At various epochs the Pactolus has revived its fame as a gold-bearing stream. The grains of the precious ore found in its bed and on its shores are, no doubt, triturated from the quartz rocks in Mount Imolus, where lie its foundations. In the time of the Lydian kings the gold treasure of the Pactolus made Sardis the richest city in the Eastern world. Shafts sunk in the bowels of the mountain and crushing mills after the California pattern might render the Pactolus and its mountain region as famous as in ancient times. But this will never happen under the slothful, unenterprising domination of the Turks.

Silver Reef

The *Pioche Record* learns the following items in regard to affairs in and about Silver Reef: The mill built by the Christy M. & M. Co. is on line between Bonanza City and Silver Reef. It has five stamps, six pans and three settlers. The machinery was furnished by Prescott, Scott & Co., of San Francisco. The contract for building the mill was let to White & Allen, the contract specifying that it was to be a first-class mill in every respect. As a guard against fire a four-inch pipe, 1,500 feet in length, has tapped the main ditch of Quail creek, and the pressure at the mill is 65 feet, thus insuring a bountiful supply to the mill both for use and in case of fire. They expected to start up on the 2d inst. The company's mines are the Silver Flat, Tecumseh, Silver Point, Chloride Chief, Silver Crown, Maggie and California; the five first being purchased from Barbee, the Maggie from the Willett brothers, and the California from Grant, Giffried and Brisacher. The company expects that with these mines they will be compelled to erect a larger mill. The Rock Cliff mill has changed hands, being now under the management of Col. Wall. The Barbee and Walker mines are looking well and the owners expect to bring in a mill soon. The Leeds company is working as successfully as usual. At the Pinkham mine the west shaft is down 85 feet, and are expecting to strike ore at every foot that is made in depth. As soon as ore is struck the mine will be worked vigorously. There is no reason why this mine in three months from this date should not divide the honors with the Leeds company. The town of Silver Reef is being improved fast, probably beyond its necessities. The mill being built on the edge of the town has given an impetus to business generally. The whole outlook of the Leeds district is cheerful and encouraging.

THE BIGGEST NUGGET.—Who found the biggest chunk of gold ever raised in California? is a question sometimes asked. John J. Finney, one of the old Shasta county pioneers, now residing near French Gulch, uncovered in the early mining times of California, about 10 miles from Downieville, in Sierra county, a chunk of solid gold that weighed 5,120 ounces, but not being compact it was broken in taking out. This is probably the best day's work ever done by a single miner. Like nearly all the old miners who have handled fortunes, John is still prospecting for the hidden wealth.—*Reading Independent*.

MECHANICAL PROGRESS.

Wedging Down Coal.

Workers in Pacific coast coal mines may be interested to read of a new process which is being employed in mining bituminous coal in England. *Seward's Coal Trade Journal*, in giving an account of recent trials, says: A half-inch hydraulic ram worked by hand, was used, this being connected by means of wrought iron tubing with the cylinder, in which a portion of the wedge was inserted, and the cylinder, four inches in diameter, and 11½ inches in length, was bolted to the clips of the wedge by two bars, constructed so as to allow the cylinder being moved to its original position when the wedge had been forced to the full extent of the stroke. The first experiment was in a "strait" placed on the end of the coal, 10 feet wide, the coal being cut on the higher side. The hole was placed on the lower side, and was three feet six inches deep, and the coal was holed a distance of nearly four feet. The wedges were placed in the drill hole, and in 17 minutes, 4½ of which were occupied in fixing and refixing the wedge and clips, the coal was successfully brought down. The weight of the coal dislodged was nearly four tons, and a very small proportion of this was slack. The second experiment was also on the end of the coal, this time with a side loose on the higher side. The length of the block was 12 feet, this being holed four feet. The drill hole was again three feet six inches deep, and was placed on the lower side. In 7½ minutes after inserting the wedge, the coal was brought down, forcing it off clear to the back of the holing on the higher side and leaving some six inches on the lower side. The cylinder had to be moved once, and this occupied 2½ minutes, so that force was only applied 4½ minutes. Between seven and eight tons were estimated to have been got by this one wedge, and very little of it was slack or even small coal. This third attempt was more to see whether, with the assistance of the wedge, side cutting could be entirely done away with, or if this could not be attained, what labor would be saved by first using a wedge. A place was selected in the face of the coal, 18 feet 6 inches long, and this was holed four feet deep. Drill holes three feet six inches in depth were put in on both ends, and the wedge was first used in the one on the right-hand side. After being forced a distance of two feet, the side, although the coal was not forced off, was so shattered that a collier was enabled to cut it out and cut the side in 26 minutes, the time generally taken to this work being two hours more.

WHY A BELT RUNS ON THE HIGHER PULLEY.—This problem is explained by J. H. Cooper in his new book on "The use of Belting" as follows: "That end of the belt which is towards the larger end of the cone is more rapidly drawn than the other edge; in consequence of this the advancing part of the belt is thrown in the direction of the larger part of the cone, which obliquity of advance towards the cone must lead the belt on its higher part. It may here be observed that this very provision—the rounding of the face of the pulley—which keeps the belt in its place so long as the machinery is in proper action, tends to throw it off whenever the resistance becomes so great as to cause a slipping. To maintain a belt in position on a pulley, it is necessary to have the advancing part in the plane of the wheel's rotation."

PHOSPHOR-BRONZE.—We read in a report of the English Polytechnic Society's fair, that the Phosphor-Bronze Company obtained a first-class silver medal for a large collection of exhibits illustrating the various uses to which this invaluable alloy can be put. Phosphor-bronze is a compound of tin, copper and phosphorus in certain proportions, according to the special work required. Among the exhibits were several bearings that had been in constant use for long periods without appreciable injury, and a plunger that had been in operation 572 days without giving any evidence that it had been in wear at all. Few better illustrations of the wear-resisting properties of phosphor-bronze could have been afforded.

STANDARD MEASURES OF LENGTH.—The Justices of Lancashire, carrying out a recommendation of the Board of Trade, says *Iron*, have caused to be erected at Manchester, a low platform of masonry, on which is supported the measures for testing the following lengths, according to the fixed standard—100 feet divided into 10 lengths of 10 feet; a chain of 66 feet divided into links; 1 foot, 2 feet and 1 yard divided into inches and parts of inches. This has been most useful, and large numbers of builders, surveyors, artisans, etc., constantly avail themselves of this opportunity of adjusting their measures according to the certified standard of mural lengths.

CASE-HARDENING.—*Polytechnic Review*: In case-hardening iron to a considerable depth, the unhardened portion is weakened by crystallization. This difficulty may be completely remedied by first hardening as usual, then annealing the articles the same as if of steel, in which operation the iron will assume its original fibrous structure; then harden, and, if required, temper the same as steel.

A SUN STOVE.—An East Indian newspaper, the *Times*, says: The other day a trial was made of Mr. Adams' patent solar cooking apparatus; the result was pronounced to be highly satisfactory. At 11 o'clock in the forenoon the apparatus was set placed in the open air as to receive the solar rays, and about every half hour its inclination was changed by a touch of the hand. About 4 o'clock in the afternoon the apparatus was removed from the spot, placed in a room, and covered with a railway rug. At 8 p. m., when the cover and the rug were removed, the contents (several pounds of mutton and some vegetables) were found thoroughly cooked. The apparatus, we may state, consisted of a copper vessel tinned inside and painted black outside, with a glass cover enveloping the vessel with an inch of hot air. The solar rays, passing through the glass, we are told, became transformed into obscure heat, which the glass retained. The vessel was fixed on the bottom of a conical reflector lined with common silvered sheet glass, and was 21 inches square at its large base and eight inches at its small base. Mr. Adams has made another apparatus of greater simplicity than the one experimented upon, which, by means of solar rays, and in the open air, can cook chops and steaks as well and as expeditiously as over a coal or coke fire. A very important point is that the heat can be retained as long as three hours and a half, and perhaps longer. Mr. Adams hopes soon to be able, under more favorable circumstances than at present, by means of an apparatus constructed on the same principle, and by a combination of flat reflectors, to concentrate solar rays to such a degree as to work wonders in science yet undreamt of.

TO STRAIGHTEN WARPED WOODS.—Of all the trials and vexations that beset the beginner there are none more annoying than this tendency of his wood to warp. He sends to his dealer for a small assortment of fine woods, and expects to receive them perfectly true and flat. Perhaps the woods are flat when they leave the dealer, but in transit they are very likely to twist out of shape, reaching their destination badly warped. The expressman may not be aware of the subtle nature of these woods, and in not a very gentle manner lays the package on a damp, cold floor. The dry wood sucks in the moisture on one side, swells and curls. It should not be a difficult matter to cure this. If the wood is in a large piece the convex or hollow side should be steamed or moistened a little, and then laid upon a dry floor, holding it down with a smooth, flat board, upon which weights are placed. When quite dry it will be found to have regained its original shape. If the wood is in small pieces it can be easily straightened by gently steaming the convex side over a teakettle, and then holding the other side towards the heat until it becomes straight, when it can be left in a press or under weights for a few hours. Almost any warped woods will yield under this treatment.

SOLDER AS AN AID TO CHUCKING.—Prof. Sweet in his last talk on lathe working in the *Polytechnic Review* gives the following hint: Very few machinists appreciate the advantages gained by the use of a little solder. Often irregular pieces can be soldered to a block or casting, and chucked easily; and after finishing, a little heat melts it loose. I have seen various straps, bolts and clamps put around the two halves of a brass box to hold them for boring out, when the application of a little solder would have held them together like a solid box. It is well enough to remember that if you have a piece of work which you can neither chuck on the lathe nor hold in the vise, to solder it to a piece you can hold. In setting work in a four-jawed chuck, much time is saved in adjusting it first in one direction, that is by adjusting the first and third screws, entirely disregarding the other two; then when the piece is true in one direction, turn to the second and fourth screws and adjust those in like manner.

RAILROAD TIES.—A recent lumberman's circular estimates the number of railroad ties in present use in the United States at 150,000,000. A cut of 200 ties to the acre is above rather than under the average, and it therefore has required the product of 750,000 acres of well timbered land to furnish the supply. Railroad ties last about five years; consequently 30,000,000 ties are used annually for repairs, taking the timber from 150,000 acres. The manufacture of rolling stock disposes of the entire yield of 350,000 acres, and full supply of near 500,000 acres more, every year. It appears, then, that our railroads are stripping the country at the rate of 1,000,000 acres per annum; and their demands are rapidly increasing.

HISTORY.—The *American Manufacturer* says: The first foundry in Pittsburgh was erected in 1803, on the site now occupied by the postoffice. Its products at first were pots, kettles, and other domestic utensils, but in a few years it was called upon to make cannon-balls for the government, and in 1811-12, the first cannon made west of the Allegheny mountains was cast at this foundry, the establishment being thereafter kept busy furnishing cannon and shot till the close of the war in 1814.

CARBOLIC ACID ON METAL-CUTTING TOOLS.—The *Papier Zeitung* mentions that a Herr J. Ashby strongly recommends the use of carboic acid for moistening the tools with which metals are worked. The duty of the grindstone is even said to be increased by the use of the acid. The dark and impure acid can be used for this purpose.

SCIENTIFIC PROGRESS.

Abundance of Life in the Arctic Seas.

It is a popular error that the cold of the Arctic seas is unfavorable to fish life. "In truth," says Prof. Hind, "the Arctic seas and the great currents flowing from them are in many places a living mass, a vast ocean of living slime, and the all-pervading life which exists there affords the true solution of the problem which has so often presented itself to those engaged in the great fisheries—where the food comes from which gives sustenance to the countless millions of fish which swarm on the Labrador, on the coast of Newfoundland and in the Dominion and United States waters, or wherever the Arctic current exerts an active influence." In the Arctic seas the waters are characterized by a variety of colors; and it is found that if a fine insect net be towed after a ship it becomes covered with a film of green in green water and a film of brown in the brown water. These films are of organic origin. "It is a living slime, and where it abounds there are also to be found swarms of minute crustaceans, which feed on the slime, and in their turn become the food of larger animals." Dr. Brown has shown that the presence of this slime, spread over 100,000 square miles, provides food for myriads of birds that frequent the Arctic seas in summer, and also furnishes sustenance for the larger marine animals, up to the giant whale. "During the recent voyage of the *Valerius* to Disco, Dr. J. Gwyn Jeffreys, when between 200 and 300 miles east of Cape Farewell, caught with the towing net some floating masses of pulpy greenish matter, which was found to consist of a vast assemblage of diatoms, each individual being about the tenth of an inch in length. This diatom was subsequently found to have a very wide range, and to extend over some thousands of square miles." These contribute to the support of the smaller marine animals, and these in turn to higher forms.

This "slime of the ocean" appears to live abundantly in the coldest water and in the neighborhood of ice. The great ice drift coming from the Spitzbergen seas, sweeping round Cape Farewell, then northwesterly to Davis' straits, is augmented by immense bergs and flocs from Baffin's bay and Hudson's straits, and at length, on the banks of Labrador, countless thousands of these ground, bringing with them their "slime." Thus the "slime" which accompanies the icebergs and ice flocs of the Arctic current accumulates on the banks of northern Labrador, and renders the existence possible there of all those forms of marine life—from the diatom to the minute crustacean—and from the minute crustacean to the crab and prawn, together with molluscan animals and starfish, in vast profusion—which contribute to the support of the great schools of cod, which also find their home there.

DRAINING THE GERMAN SPRINGS.—Much excitement has been created at Ems, in Germany, the most famous of Continental watering places, by the threatened destruction of the baths which are its main dependence. The mining companies working in that neighborhood are undermining the springs. The mines formerly supplied lead and silver only, but since the extension of the manufacture of steel, the gangue rock—which is a carbonate of iron—has become more important than the other parts of the ore. The fact seems to be that the increased activity given to the operations by this new source of profit has led to excavations to a depth which may really interfere with the natural water courses of the region. Such a result is by no means new in mining, for, frequently, wells and springs dry up when the shafts near them are sunk to a great depth. Sometimes the mine is the sufferer from this mishap, as was the case with the famous Rammelsberg copper mine. The discovery of a very rich vein in one portion of the workings was followed by the drying up of the wells in Goslar, a town of 10,000 inhabitants, situated two or three miles from the Rammelsberg shafts. The managers were obliged to wall up their rich stores and forego the benefit of working them. At Ems an investigation has been ordered, but as yet the result has not been reported, so that, for the present, it cannot be determined whether the baths or the mines are to be the sufferers.

A JAPANESE DIRECTORY.—Prof. Edward S. Morse, now of the University of Japan, in lecturing about the Japanese in Cambridge, the other evening, praised their diet of grasshoppers as extremely palatable. He described the city directory of Tokio as a much more poetical volume than people are accustomed to think directories can be; it contains, besides the names of streets and business places, the localities of pleasant walks about the city, with directions where "sweet singing insects" can be heard, the best place to see fireflies and tinted foliage, etc.

THE SYCAMORE OF PALESTINE.—The sycamore of Scripture, it may be observed, is a species of fig. The English sycamore, a maple, and our sycamore, the buttonwood, being so called from the resemblance of their leaves to the old-time fig. It was at one time thought, from carvings, that the orange grew in Egypt; but the representations are now proved to be the fruit of this sycamore fig.

The Future of America.

Rev. Joseph Cook recently delivered a lecture in New York City on "Ultimate America." Of our continent's field for progress in the future he said:

It is not commonly known that the amount of arable soil in North and South America is greater than that in Europe, Asia and Africa put together, and can therefore sustain more lives. This is no rash conclusion. I speak from a scientific basis. The remnant of productive soil (as the scholars say, I do not assert it on my own authority), is 10,000,000 square miles in the Old World, and 11,000,000 in the New. Thus bursts upon us in all the light of scientific truth the fact that America can sustain a greater population than the Old World, and if she can, it is unquestionable that she some day will. In this circumstance I hear the echoes of fate, with whose footfalls it is fitting that the centuries should keep step. Some of us who are not yet very old have seen our population increase from 27,000,000 to 40,000,000. Some have seen it increase from 8,000,000 to 40,000,000.

Suppose that there are 100,000,000 persons in all America in the year 2000. This is surely a moderate estimate, for now there are 84,000,000. Suppose that after this year 2000 our increase is one per cent. a year, or less than the present increase in England and Germany. It is said that the imagination is audacious, but this reason is more so. On this basis what do we find the future of America to be? Its population in the year 2600 would be 6,400,000,000. The *Encyclopedia Britannica* affirms that North and South America can furnish sustenance for 3,600,000,000. Europe has an average population of 80 persons to the square mile. We have an area of 15,000,000 square miles. If we conclude (and why may we not?) that we shall some day have as large an average, our population will be 1,200,000,000. Before such a stupendous future we should remember that America has been twice washed in blood because past generations have been poor rudders. In this view of the case, the age has, therefore, not ceased to be a crisis.

The Microscope in the Laboratory.

In a late issue of the *Chemical News* Dr. P. Townsend Austen, of the New York School of Mines, says: In chemical research the microscope always plays an important part in revealing the presence of crystalline substances in solutions. The usual method of preparing substances for examination by the microscope when, as in the laboratory, fine microscopes, animalcules, cages, and other conveniences are not at hand, is to evaporate some of the solution on a watch-glass over a micro-chemical gas-flame, and then rub with a glass rod, when the crystals begin to grow on the minute scratches in the glass, and thus set up a general crystallization. The crystals formed in this manner, however, are rarely satisfactory, being often broken, misformed or mixed with a large amount of the substance in a partially amorphous state.

If the solution be evaporated to the right consistency in a watch-glass, and another watch-glass of the same size, previously warmed, be placed upon it, the drop expands to a film. This upper glass should not be pressed, but allowed to rest of itself. The film is similar to the one obtained in an animalcule cage, being, however, thicker. If now a few drops of ether be placed in the upper watch-glass, the cold caused by the evaporation of the ether will cause a crystallization to take place between the watch-glasses. The growth of the crystals can be quite accurately managed by increasing or diminishing the cold on the surface, by blowing on the ether.

The crystals formed are, as a rule, perfect in shape. I have, by these means, obtained well-defined crystals from solutions, which, by rubbing with glass rods, afforded me only amorphous powders.

NEW ELEMENTS.—At a meeting of the chemical section of the New York Academy of Sciences, held December 10th, an important letter from Prof. G. A. Koenig, of the University of Pennsylvania, was read, in which he makes the following communication: "I am engaged, and have been for a considerable time past, in a study of titanium. The investigation is one absorbing much time, and the progress is very slow. My results hitherto obtained convince me that TiO₂ is capable of being separated into compounds yielding different reactions, and hence that titanium must be considered as composed of two metals at least, but I think three. The trimorphism of TiO₂ led me into this investigation, and will find finally its explanation in the above sense. I am unwilling, however, to publish partial results."

A NEW ARCTIC EXPEDITION.—A whaling steamship, the *Vega*, has been bought for the Swedish Arctic expedition, which is to start next July from Gothenburg. The vessel is very strongly built, and can carry coal enough for a cruise of 8,000 miles; she is to be supplied with sufficient provisions to serve for three years. Capt. Palander will be in command; less than 30 persons will be on board, in all; three or four will constitute the scientific corps. The King of Sweden, the Government, Oscar Dickson, of Gothenburg, and Mr. Sibiriakoff (a Russian), conjointly defray the expenses. The projected voyage will circumnavigate both Asia and Europe.

We shall for the present print our "Mining Summary" in type a size larger than we have been accustomed. In order to give the same amount of reading matter, we shall transfer the "Mining Shareholders' Directory," mining stock tables, etc., to the twelfth page weekly, leaving the entire fourth and fifth pages of each edition for the "Mining Summary," where our readers may look for it hereafter.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

THE MOORE MINE.—Amador Independent Jan. 5: Work at this mine is progressing rapidly under the management of Messrs. Hill and Hewitt. The shaft has been opened and re-timbered down about 75 feet—to the water's edge. There is supposed to be about 100 feet of water in the shaft, and hydraulic hoisting works are being constructed for the purpose of hoisting the water out, which will be in operation in the course of a few days.

HYDRAULIC MINE ON HUMBURG HILL.—We learn that Mr. James Meehan and others are making preparations for working their hydraulic claim on Humburg hill, near the Kennedy mine, on an extensive scale.

A NEW DITCH.—Messrs. Payne & Co., proprietors of the large gravel claim near Moon's ranch, are engaged in cutting a branch ditch from the Amador canal to their claim, for the purpose of obtaining water sufficient to work on a more extensive scale. The ditch will be about three miles in length, and capable of carrying 1,000 inches of water.

DRY TOWN.—The Pennsylvania mill is fast approaching completion, and they will probably be ready in another week to commence crushing. The new steam hoisting works are being pushed ahead as fast as possible, and everything looks favorable for an energetic working of the mine.

The ten-stamp mill of Mr. John A. Davis, about one mile up the creek from here, is completed, and only waiting for water.

The Crown Point M. Co. are about to sink a new shaft, when it is believed they will find considerably richer rock than they have yet worked.

The Bonanza is now being worked by some of the creditors of the company.

I UNDERSTAND the Mexicans and Austrians have been getting very rich pay out of the "Black Hills," as it is called here, or the Loyal Lead claim; but their lease will expire on the 21st of February next, when the property will revert to the owners, the Loyal Lead G. M. Co.

The scarcity of water makes times a little dull here just at present.

PLYMOUTH.—Cor. Amador Ledger, Jan. 5: Quartz mining on claims prospected last summer has been suspended until spring, although I hear that the Central mine, on the ranch of R. H. Duncan, between the forks of the Cosumnes, is to be pushed through the winter. Hunter & Co.'s mine, near the Central, was sold, some months back, to a San Francisco company, but they have suspended work for the present. In the spring we anticipate that work will be revived on all these claims.

CALAVERAS.

WATER FAILED.—Calaveras Chronicle, Jan. 5: The water in the ditch is reduced to its minimum. In fact, it has failed almost entirely. There was not to exceed 40 inches Wednesday, and all the claims—even the Gwin mine—have had to suspend operations in consequence. The cold weather has solidified the aqueous fluid in the river above here.

GOLDEN QUEEN. owned and superintended by John P. Spaulding, Esq., has struck it rich. This is one of the finest prospects in the district.

At the Hortense, Lewis & Fairchild are still extracting the precious, and will soon have a crushing that will astonish all. This mine is located in Specimen gulch.

INYO.

BULLION SHIPMENTS.—Coso Mining News, Jan. 5: On the 31st ult. the Emigrant M. Co. shipped 135 pounds of silver bullion, valued at \$1,500. The total shipments of this company, as given in at Wells, Fargo & Co.'s office here, for the month of December last, were \$11,250. There was also shipped, by prospectors, gold bullion valued at \$600. As the mill of the Sheldon M. Co., at Snow's canyon, is running successfully, we expect to be able to record some very good shipments of gold bullion during the present month. Considering the fact that the Emigrant Co. has had but five stamps running only 12 hours each day—in consequence of the inadequate supply of water—we think the members of the company may congratulate themselves for the success they have met with. In less practical hands than those of Mr. Peter Taylor, Superintendent, and Mr. Smith, amalgamator, we presume we would not have had the pleasure of writing this article.

LEE DISTRICT.—Lee is coming to the front as a business place, all from the success made by the Emigrant M. Co. We predict that, when the company shall have removed their mill up to the mines and brought the water in, Lee will assume the proportions of the best camp in the county. Other mines will be worked and more mills put in operation.

NEVADA.

ABOUT READY.—Nevada Transcript, Jan. 4: The Pioneer Reduction Co. will be ready for work next week. The mill and sulphuret works will be ready to start up about the same time. A large lot of rock which is being taken out of George Smith's mine will be crushed there.

BULLION.—Grass Valley Union, Jan. 9: The Bullion Co. started up its new batteries of eight additional stamps yesterday. This makes 18 stamps in all at the Bullion mill, and will enable them, at least for the present, to crush the ores of both the Bullion and the Alaska mines.

The South Yuba Canal Co., the North Bloomfield Gravel M. Co., and the Milton M. and Water Co. paid their taxes, some \$20,000, on Monday, to the County Treasurer, under protest. This will cause a looking up of the money until the matter is decided by litigation. Although these companies pay a large tax, it is the general belief of those familiar with the properties that they are not assessed at a high figure, and a suit at law will demonstrate the fact. The protesting companies may embarrass the county for a time by tying up this money, but it is not likely to prove a saving of money to them in the end.

PLACER.

DIVINE MINING ITEMS.—Dutch Flat Forum, Jan. 3: From Mr. A. Wilson, of Forest Hill, who has been visiting Auburn, this week, we learn that at the Centennial mine, near Todd's Valley, work is being pushed ahead vigorously and the gravel is paying well. Pond & Constable, of Todd's Valley, have their hydraulic mines all fitted up in fine condition for washing and are only waiting for rain enough to fill the ditches. They fired off a big blast recently that did excellent execution. The Big Spring claim, near Forest Hill, run by the May boys is fitted up for hydraulic, but in the absence of water as yet the parties are drifting away, determined if they can't get hold one way they will have it another. The Dardanelles, in the Forest Hill district, have completed their extensive and expensive season's repairs to both mines and ditches and have considerable ground blasted. With plenty of water this company will make things lively. The Green Spring, east of the Dardanelles, W. Jones, Superintendent, is fitted up for hydraulic, but, like the other hydraulic mines, is waiting for water. At the Hope mine, run by Barlow & Phillips, they are drifting and it is understood are doing well. Reamer is prospecting and fitting up the Baltimore for future operations. The Jersey, a drift claim, owned by a Welsh company, is now doing well. They have been troubled some with bad air in the past, but this difficulty being overcome, they are now in a fair way to make things count. Harry Adams & Co. and Cranage & Co., both big claim owners at Smith's Point, are, owing to the scarcity of water, preparing to work their claims by the drift process. Trafton & Hodge, at Yankee Jim's, are sinking on their newly-discovered quartz ledge, the Badger. They prospect the claim thoroughly.

PLUMAS.

IMPORTANT MINING STRIKE.—Plumas National, Jan. 5: The workmen in the Summit mine, above Spanish ranch, struck gravel one day last week. Work on the tunnel has been in operation for several months, and it has been run into the mountain some 700 feet, the last 200 in pipe clay. When the tunnel struck through the rim it was, of course, known to be too high, but was run ahead, we suppose, in the hope of striking the raise of the bedrock. After going about 200 feet in the clay it was decided that the better plan was to sink a shaft from the tunnel, and at the depth of 33 feet blue gravel was found which prospects well. The channel is a very large one and this is the first time it has ever been prospected. Numerous breaks from it have been worked and paid richly. Probably all the gold in the Silver creek country came from it. The Summit company will have to be at the expense of a new tunnel, but as they have now a certainty of good pay when they get in, there will be no trouble in getting the capital required for the work. We consider this one of the most important discoveries made in Plumas, as it demonstrates that this channel, which can be traced for miles, is a rich one, and there is no doubt but that profitable work will be made for hundreds of men, and a brisk mining camp spring up which will last for many years to come.

ITEMS.—The Blackhawk company have their flume nearly completed. The Plumas National mine, on Soda creek, is paying steadily and well. The mill yields about \$180 per day, besides saving a ton of sulphurets for future working. The owners are well satisfied with the prospects, and well they may be. The rock in the Green Mountain mine has improved considerably in the developments in the past few weeks. We hear that J. McVey has recently sold his Silver creek claims to Taylor & Co. The Wisconsin company have recently added five stamps to their mill, and now have 15 stamps at work. The rock is paying first-rate. A rich strike is reported in the lower level of the Gold Stripe mine.

SIERRA.

SHORT.—Mountain Messenger, Jan. 5: The force of workmen is very small in the Bald Mountain mine, owing to want of water to wash dirt. Their dumps are all full.

NORTH FORK.—The North Fork tunnel is nearly in to pay gravel. The rock, which gave them so much trouble, is reported to have stopped swelling.

NEXT year the waters of Big canyon will be brought in through the mountain to La Porte, when five new mines will be opened there.

BRUSH CREEK.—The Brush Creek mine is reported to have developed a larger ledge than ever before found of the richest kind of rock. The prospects are brilliant for an extensive and permanent mine.

STRUCK IT.—The owners of a quartz ledge near the Pliocene mine, have found rich quartz in their tunnel. They are in, perhaps, 30 or 35 feet only. The ledge is the same that crosses the South Fork just below Jenkin's bridge.

RICH FIND.—A three and one-half ounce nugget, almost solid gold, was picked up, the other day, at Little Grizzly. Dr. L. W. French took it to Los Angeles, where the members of the company, who recently bonded Bunker Hill mine, reside.

MORRISTOWN.—One foot and a half of snow fell here during the recent storm. The hydraulic mines only need the encouraging stimulus of a little water to yield as fruitfully as ever. J. H. Thomas, of La Porte, has acquired by purchase most of the mining ground hereabouts, and next spring will bring in water for working the extensive hydraulic property at Craig's Flat. It is also his intention to start a mill and open a store at this point.

EUREKA.—Everybody here prepared for work when water comes. Tom Baird is now as well if not better fixed for a vigorous campaign on his hydraulic claim than any other in the State. He has one 30 and one 25-inch pipe, capable of feeding four monitors, all ready for water season. F. Blake and B. F. Folsom are out on bedrock, working with water from the French ditch. Thatcher & Parks are well fixed with pipes down the hill and monitors set. Jack Hardy, Chaparral hill, has rich gravel in both gangways. Henry Baker, Wm. Frank and others still take out pay dirt, expecting water daily for a bonanza clean-up. Scott & Crooks, of the old Clamper diggings, are prepared for work.

TRINITY.

MORE QUARTZ.—Trinity Journal, Jan. 5: Mr. C. M. Ritter, of Lewistown, writes us that he anticipates furnishing the Journal with an interesting item from Eastman's gulch, about the 1st of February. A company, of which he is a member, have been taking out quartz from a ledge in that locality and now have a lot of good rock ready for crushing. An arastra has also been erected and crushing will commence as soon as the freezing weather is over. The boys look for big results.

RICH RETURNS.—Messrs. Belleau & Trotter had a "Happy New Year" in reality after cleaning their arastra at the Deadwood quartz mines. From 16½ tons of quartz milled they realized about \$3,700, besides leaving gold in the arastra estimated at from \$500 to \$1,000 more. This shows an average of over \$230 per ton, and Mr. Belleau informs us that they have plenty more quartz equally as good at the dump. The cold weather has dried up the water, but the company will keep at work getting out quartz, and when they complete the tunnel they are now driving, they will have all three of their quartz veins tapped and commence breasting out on each of them. The length of the tunnel now being run will be about 500 feet and it will strike the veins at a good depth for working to advantage. Prospecting is being carried on in the other claims and the present indications are that Deadwood will become a lively mining camp once more.

Nevada.

WASHOE DISTRICT.

CALIFORNIA.—Gold-Hill News, Jan. 9: Daily yield, 650 tons of ore. The bullion yield of the ore crushed during the month of December was \$1,635,892—which leaves a nice little surplus on hand after paying all expenses and the usual monthly dividend of \$1,080,000. The ore stops on the 1500, 1600 and 1650-ft levels are yielding rich ore, and show well at every point. On the 1650-ft level the north drift in the ore vein is steadily advancing, the face in rich ore. No work of value is being done on the 1700-ft level at present.

CON. VIRGINIA.—Daily yield, 550 tons of ore. The ore stops in every portion of the mine are looking splendidly, and yielding the usual rich character of ore. The bullion yield for 25 days' run of the mills for the month of December was \$1,552,994, from which the usual monthly dividend of \$1,080,000 has been declared. The mills are all running and crushing ore up to their full capacities. A few days since a story to the effect that the Brunswick mill, on the Carson river, had shut down, gained credence; but this is not the fact, as that mill is running and crushing regularly its 100 tons of ore per day. On the 1750-ft level crosscut No. 3 is still advancing, the face in porphyry. The ore in the face of the north drift from No. 3 crosscut is very rich, assaying as high as \$200 per ton, with every appearance of the widening and improving of the ore body to the northward.

LADY WASHINGTON.—The main drift south at the 850-ft level, to connect with the Justice, is making good progress, and continues in low grade ore.

WARD.—Sinking the shaft is going vigorously forward. It is now down 1,010 feet.

OPHIR.—The south drift on the 1900-ft level east of the ore vein is steadily advancing, the face in vein porphyry. No crosscutting has been attempted. The joint Mexican winze on the north line will connect in a very few days with the west crosscut from the north drift on

the 1900-ft level. Everything working well at all points above and below ground.

YELLOW JACKET.—The main east drift on the 2200-ft level is out 698 feet; face still in hard porphyry. The north drift on the same level, towards the Imperial, is in 488 feet, and connected with the south winze of the Imperial last Sunday. The stone masons at work on the foundations for the pump engine and machinery are rapidly drawing their labors to a close.

SILVER HILL.—The east drift on the 800-ft level is steadily approaching the ore vein, with the most favorable features for the development of a solid concentration of the ore and quartz on that level. The southeast drift on the 600-ft level is still in ore and quartz.

NORTH CON. VIRGINIA.—The east and west drifts on the 1350-ft level are both being advanced rapidly to cut and prospect the ore vein. It will not be long now before another station will be opened and new drifts will be again started to open the mine at a still greater depth.

SIERRA NEVADA.—The south drift on the 1500-ft level has reached the Union Con. line, where a winze is being sunk to connect with the north drift from the Mexican.

MEXICAN.—No work is being done on the 1600-ft level, pending the connecting of the north drift in Union Con. with the Sierra Nevada mine. As soon as that is completed, and air obtained, crosscutting and prospecting this level will be resumed.

CHOLLAR-POTOSI.—The connection between the east drift on the 1785-ft level and the west drift from the combination shaft, was completed on Saturday last, and a strong current of good air obtained. This will give a fine chance for crosscutting and developing the ore vein on this level.

JULIA CON.—Sinking the main incline is going ahead as rapidly as the nature of the work and difficulties of hoisting by band will permit. The foundations of the new hoisting engine at the 1800-ft station are completed and the engine is expected on the ground in a day or two more.

JUSTICE.—The dumps are all full of ore, and a new roadway is being constructed by which a considerable saving will be effected in delivering it at the Pacific mill, which will be started up in a day or two more. The ore stopes on the 1150-ft level are showing splendidly as they are being opened ready for the extraction of ore. The south prospecting drifts on this level are looking much more favorable. The 1300-ft station is being opened in the main incline.

UNION CON.—The north drift on the 1600-ft level has very nearly reached the north line of the mine, at which point an upraise will be made to connect with the winze now being sunk below the 1500-ft level south drift of the Sierra Nevada for air purposes.

UTAH.—The north drift on the 1350-ft level is steadily advancing and is now in a distance of 185 feet. The east crosscut on the 1150-ft level is making the best of headway, the face in lively vein matter.

ALTA.—The winze in the ore vein below the 1050-ft level was connected during the week with the north drift on the 1150-ft level of the Justice, giving a good circulation of air, and proving the Justice ledge and that of the Alta to be the same almost beyond a doubt. The west drift on the 1150-ft level day before yesterday struck the ore vein, developing \$15 to \$20 ore, which is improving as the drift is advanced.

BULLION.—Sinking the main incline below the 1700-ft level is going steadily forward without change of value to record. Sinking the double winze below the 1840-ft level is also making good progress.

OVERMAN.—The double winze below the 1400-ft level is being sunk with all the speed possible, the bottom still in favorable ledge matter.

BEST & BELCHER.—Sinking the donkey winze below the 1700-ft level has been stopped on account of the great quantity of water encountered, until the Gould & Curry shaft can be connected with the 1900-ft level and the pumps placed so as to take the water.

GOULD & CURRY.—Sinking the main incline is going vigorously forward. It is now about 45 feet below the 1800-ft level. The flow of water continues quite strong. The foundations for a large air compressor are about completed.

CON. IMPERIAL.—The south drift from the bottom of the south winze, on the 2400-ft level connected with the north drift of the Yellow Jacket during the week, giving a fine circulation of air. This connection will now enable the commencement of the development of the ledge in that portion of the mine.

SUTRO TUNNEL.—Very good advancement is being made with the header. It is running in regular Comstock vein matter, and has just passed through a streak of quartz and porphyry 20 feet wide, from which several pretty good assays were obtained. Total length of tunnel last evening, 18,679 feet.

CROWN POINT.—Daily yield, 60 tons of ore, from the old upper workings. There is no material change in any of the upper workings or in the prospecting drifts on the 2000-ft level. The yield of bullion for December was \$41,697.

NEW YORK.—The shaft is down 97 feet below the 800-ft station, and sinking in very favorable looking material, with frequent streaks of fine looking quartz coming in, indicating something better very shortly.

TROJAN.—Owing to the legal trouble induced by the suit of an employee for wages, work was stopped day before yesterday, but this difficulty was very soon arranged and work is resumed again.

HALE & NORCROSS.—The pumps are kept

steadily running, and with the aid of the water tanks in use at the Savage mine, are gradually gaining on the flow of water, which is now 42 feet below the 2000-ft level.

LEVATHAN.—The incline is now down 53 feet below the 600-ft level and in good working ground. It is sinking at the rate of 2½ feet each 24 hours, and passing through streaks of quartz that look finely and give low assays.

SENATOR.—This mine having passed into new management arrangements are now being made for working and developing it through the Sutor tunnel, which is fast approaching it and will pass immediately through it, and at a depth of 1600 feet or more.

SAVAGE.—The new V boh for the pump is being manufactured at the Gold Hill Foundry, and will be placed in position in the mine in a very few days.

SUCCESS.—The shaft is making good sinking progress, and the very favorable material mentioned in last week's report continues to be passed through.

BALTIMORE AND AMERICAN FLAT.—The north drift on the 1400-ft level is showing some very favorable quartz with streaks of ore.

SOLID SILVER.—The work of retimbering the main tunnel is making very good progress, and crosscutting and stoping out ore will be commenced next week.

ELY DISTRICT.

ASSESSMENT WORK.—Pioche Record, Jan. 5: Some of our claim owners are not going to lose their claims for the want of money with which to do the requisite amount of work, as on Wednesday last some Indians were placed on one claim so as to prevent it being jumped. Of course Indians cannot do much in the mining line, but still they can be made to do enough assessment work to prevent any trouble until the owners can get enough surplus cash to pay miners' wages.

DAY.—The south drift continues in very rich ore. The discovery cut continues to improve both as regards quantity and quality. From indications in the south drift, as well as in the discovery cut, both the ore bodies seem about to unite, confirming the experts theory of the formation.

HILLSIDE.—From Eugene Blair, Superintendent of this mine, we learn that they have run down on the ledge a distance of about 35 feet, and have cut through the ledge in several places, in which it is three feet in width. The ore assays well and the ledge is looking nicely.

GREAT EASTERN.—The work of straightening the shaft is finished and ways being put in. A whim is being erected preparatory to taking out ore.

BAY STATE.—Repairs to shaft are completed and are sinking with three shifts. The whole bottom of the incline is in good ore.

ALPS.—From the eighth and ninth levels considerable ore of good quality is being extracted, and as work progresses there is considerable improvement in size of vein and quality of ore. Stope between 10th and 11th is producing a much better quality of ore and in larger quantities during the last week, as the ledge has increased in width and carries a larger percentage of high-grade ore. The mill is running regularly on ore from the mine.

MAYFLOWER.—The road is completed to the mine and are making one from the ore dump to the main road. The work of exploration has been commenced at the bottom of the incline, without any material change, except in lowering the incline they struck what appears to be the top of a body of rich chlorite.

EUREKA DISTRICT.

WATER IN THE EUREKA CON.—Eureka Sentinel, Jan. 6: A rumor was in circulation yesterday morning that the bulkhead on the ninth level of the Eureka Con. had given away. On investigation we learned that the bulkhead put in over a year ago had sprung a leak, and considerable more water than usual was seeping through, but not in enough quantities to retard work. It is probable that a new one will be put in of sufficient strength to keep back the flow until such time as it may become necessary to put pumping machinery in the shaft.

Six cars of crude hullion were shipped to Palisade yesterday, valued at \$18,000.

SOME rich developments are being made at the Hoosac mine.

The lead production of the Richmond refinery is retained at the works, none being shipped at present.

The Eureka Con. and Richmond companies paid off their miners yesterday.

The main shaft at the Rescue mine, Silverado, is down 450 feet, and will be carried a farther depth of 50 feet. The mine is looking splendid.

The cost of refining crude hullion at the Richmond works averages \$13 per ton, which is as low a figure as obtains in the Eastern refineries.

Arizona.

THE LEE.—Arizona Citizen, Jan. 4: Supt. Scott is in town from the R. E. Lee mine, and says the last shot in the east drift, just before he left, threw out some very good ore, but nothing yet to make a noise about. He is confident, however, that his energetic labors will be rewarded soon, and he will be able to place the Lee on the list of dividend-paying mines. We also learn from him that the shaft on the Hannible is now down about 50 feet in good ore. They have water in the bottom of the shaft, which is a good indication of a true fissure vein.

We are reliably informed that the McMillen

company now have about \$80,000 worth of ore ready for shipment, and about \$60,000 worth of milling ore on the dump, awaiting the arrival of new machinery from New Mexico.

GLOBE DISTRICT.—This is my first visit to the extreme northern section of Globe district. The enterprise and progress of McMillen camp has been described to me many times, and yet I must say I was quite surprised to find such a large settlement here. The McMillen hill, so far as developed, is certainly the silver wonder of the world. The entire hill seems to be a network of threads and spurs leading into the main ledge. Before the present company took hold of this mine several bodies of very rich ore were taken from the opposite side of the hill from where the main shaft and tunnel is located; this main shaft is now down about 100 feet, and the tunnel is run northeast and southwest nearly 300 feet. Ore from the immensely rich strata is hoisted daily from the main shaft, and the extent of this strata can only be determined by further developments. The Hannible mine is the first northeast extension of the McMillen claim. Charlie McMillen, the original discoverer, has a shaft down about 30 feet in ice-looking ore, and the indications promise a rich strike soon. Very rich pockets of ore have been taken from the Little Mc, and the Doctor, and they are, without doubt, very valuable claims.

MIAMI CITY is situated five miles below Globe City, where the south branch meets the main bed of Final creek. As yet there are but few buildings here, but it is by no means an insignificant locality. Townsend's new 10-stamp mill has just been completed here, and is a handsome and imposing structure, and as good a mill as ever was shipped from San Francisco. It combines an ore-crusher, heating apparatus, 10 stamps, four furnaces, four Wheeler pans, two large settlers, a retort and several other minor and convenient appliances, all of which unite in the perfection of the mechanism and capacity of the mill. The mill is only awaiting the arrival of some water-pipe and a superintendent. The engine was started a few days since and the entire machinery worked as smoothly as though it had just been stopped to oil. The company intend to begin on ore from their mine, the Miami, a large quantity of the ore is now ready for the crusher, and teams are constantly plying between the mine and the mill. Outside of the Miami ore the mill will be kept running on custom work. This is something that has long been needed in this district. A great many miners have good prospects from which they have taken many tons of good ore, but they have no capital to assist in further development, and no market for their ores.

Idaho.

BLACK JACK.—Owyhee Avalanche, Jan. 5: Reports from the Black Jack mine still continue to be most favorable. At a depth of 110 feet the ledge has all the characteristics of an enormous bonanza and is growing better and better. Out of about 700 tons of rock taken from the mine during the past few weeks, less than 10 tons were put aside as unsuitable for crushing. Bullion to the value of \$7,759 has been shipped to San Francisco within the past few days.

GOLDEN CHARIOT.—At the Golden Chariot work is progressing favorably in the crosscut on the 15th level.

The Illinois Central is looking well and there is the usual force at work there.

ARRANGEMENTS will soon be made to start up the War Eagle.

WAGONTOWN.—From Wagontown the reports are quite encouraging. Mr. Walls and others have recommenced work on the Webfoot, which is undoubtedly one of the best mines in the country. The Jones mill is crushing rock from some of the other mines in the vicinity.

The ledge worked by St. Clair & Newcomb is steadily improving and there is every indication that the Ruth will turn out to be a first-class bonanza. The ledge is well defined and the pay streak unusually rich in gold.

GLENBROOK.—The Glenbrook is looking well and it is the impression of all who have inspected the ledge that it will yield a fortune to its owners, Messrs. Simondi & Martin. The pay streak is about 18 inches wide, and as the work progresses it looks better and better.

NEW COMPANY.—Idaho World, Jan. 4: A company composed of heavy capitalists in the East has been organized to operate in mining. The agent is expected here in a few days to examine the different quartz mines of the Basin.

The Golden Era mine, situated on Summit flat, is looking better than ever before. The ore is very rich and decomposed, and can be extracted very easily. The proprietors intend erecting two arastras to work it early in the spring.

Montana.

BULLION SHIPMENTS.—Butte Miner, Dec. 29: As only two of the Butte mills, the Walker Bros' and the Lexington, have been running during the past week, the bullion shipment for the past seven days has been unusually light. From the 17th to the 24th inst., there was shipped by Wells, Fargo & Co.'s express from Butte 1,161 pounds of bullion, valued at \$19,084.54. The Dexter and Burlington will both be at work after the first prox., when we shall probably have more flattering bullion reports to make.

BOILER ABANDONED.—The large boiler shipped some time ago from Salt Lake City, and intended for the pumping machinery of the Alice mine, has been abandoned on the other side of the Pleasant valley range, and there is now but little prospect of its arriving at its des-

tination before next May or June. This is very much to be regretted. It was the intention of the managers of the mine to prospect the ledge at a much greater depth than has yet been reached as soon as machinery of the necessary power was at hand, and as a boiler of sufficient size alone is lacking, the failure of the contractor to deliver his freight at Walkerville this fall practically arrests the development of the leading mine of Butte for four or five months, at least. The Messrs. Walker Bros. are very anxious to have it brought forward this winter, and have offered 10 cents freight to anyone who would convey it from the point of its abandonment to Walkerville.

News in Brief.

TICE POPE continues to improve in health. The Pottsville Bank, Pennsylvania, has suspended.

GEN. JOHN O'NEILL, the noted Fenian leader, is dead.

GENERAL GRANT has arrived in Cairo, and has visited the Khedive.

The National Woman Suffrage Association is in session at Washington.

CHARLES M. NYE, son of the late Senator, is lecturing on temperance.

The Columbia river has been filled with ice during the past few days.

DON FRANCISCO DE LA GUERRA, a noted native Californian, is dead.

The St. Gothard tunnel is in about five and a half miles.

An octopus eight feet in length was found at Hunter's Point Dry Dock a few days ago.

In New England, on Monday morning the thermometer marked from 24 to 42 degrees below zero.

The U. S. Supreme Court has rejected the famous McGarrahan claim.

The late Nathan Coombs, of Napa, left property valued at \$363,750, to be divided equally among his five children.

The garroting epidemic is becoming alarming in San Francisco. Robberies are being committed even in the day-time.

NINETY-NINE new buildings were erected at Rio Vista during last year, at an estimated cost of \$46,740.

The big California ship *Three Brothers* has just arrived from Liverpool, making the passage in 112 days.

The difficulty between Spain and Hayti, regarding the threatened execution of a Spanish subject, has been amicably arranged.

KEARNEY, Knight, Wellock and Helm have been indicted by the grand jury for riot and conspiracy, but were released on bail.

The absurd report comes from Paris, that Bonanza Mackay is to become Count di Mackay by purchasing an Italian earldom.

The Pennsylvania Supreme Court has affirmed the sentence of death passed on Molly Maguire Hexter, Tully, McCune and Kehoe.

The attachment against the Collinsville Fish Cannery, owned by Emerson Corville, has been released, and its original owners have taken possession again.

COL. SHAFER, before the sub-committee on military affairs, testified that there was less stealing on the Texas border during the past year than in any former year.

On Tuesday 14 tons of bullion were received from the California and Consolidated Virginia mines. This is one of the heaviest shipments received in this city for some time.

AUGUSTUS HEMMERWAY, of the class of '75 of Harvard College, has given that institution sufficient money to erect a new gymnasium, that will accommodate 300 persons.

A WASHINGTON special says the Cabinet has agreed to recommend a popular loan, and the President will send a message to Congress at once, asking for legislation upon the subject.

HICKOX & SPEAR, bankers of this city have made an assignment for the benefit of their creditors. The assets, including personal property of the firm, slightly exceed the liabilities.

This week has been marked by heavy bankruptcies, in Chicago especially, but also in the North and West; bad roads, poor collections, and a decline in real estate being the prime cause.

The report of the Commissioners of Immigration shows that the total number of aliens which arrived at New York last year was 54,536, a decrease of 16,129, compared with the previous year.

The new tug built by order of the Harbor Commissioners has been launched, and is now at Harrison street, receiving her boilers and machinery. She has been named the *Governor Irwin*, and will soon be ready for service.

A St. PETERSBURG dispatch says that hopes of an armistice are rapidly disappearing. The strictest secrecy is maintained as to the terms Russia would propose. It is said that even the Commander-in-Chief has not yet been instructed on this point.

LEUT. WISE and his party of explorers returned to Panama from the examination of the Bayano. The examination of this route has tended to confirm the report of Commander Selfridge, that a tunnel over seven miles long would be necessary in opening the Isthmus canal at that point.

A MINER on the Comstock was killed in a horrible manner this week. He was holding a piece of wood against a two-inch steam auger running 1,000 revolutions a minute. The auger came through the stick suddenly and heing self feeding pulled the man right on, went through the entire body, and killed him.

VICTOR EMANUEL, the king of Italy, died on Tuesday.

KEENE says he is \$2,500,000 ahead of Wall street.

It is estimated that 1,593 houses were erected in San Francisco last year.

The number of deaths in Chicago during 1877 was 8,026, or 546 less than in 1876.

The total number of hodies thus far recovered from the ruins of the candy factory in New York is 15.

A NEW fraud upon the Indians has been discovered connected with the sale of their surplus produce.

SEVERAL vessels were driven ashore and foundered in a gale on the Massachusetts coast last Friday night.

SUPERVISOR GIBBS, of this city, has been acquitted of the trivial charges of misappropriation of election funds.

The Oakland Transcript has changed hands. Mr. Johnson, of Santa Barbara, has purchased the entire establishment.

MILTON S. LATRAM has resigned the Presidency of the London and San Francisco Bank, on account of ill health.

At the East there has been an unusual fall of rain, and the prayer has been for a change to old-fashioned cold weather.

The telephone has been tried between Dover and Calais with perfect satisfaction to the inspectors of submarine cable.

The British government embargoed 2,000 cases of cartridges on board a steamer at Cardiff, destined for Constantinople.

It is said that Victoria and New Tacoma will be the termini of the Pacific Mail Steamship north coast service in a short time.

SECRETARY SHERMAN has instructed Collector Fulton to go on with the sale of property abandoned at the Centennial exhibition.

It is again reported that James Gordon Bennett is about to establish a daily paper in London, to be called the London Herald.

The Great Western market, on Bush street, in a building formerly used as a stable by the Sutter Street R. R. Co., has been opened.

The Kickapoo Indians in Mexico, formerly our "wards," are now asking to be allowed to return to the United States, as Mexico is too hot for them.

INTERNAL revenue receipts for December fell off \$448,000. The cause is thought to be the agitation in Congress to reduce taxes on whisky and tobacco.

It is stated that President Diaz has signified the desire of Mexico to resume diplomatic relations with France and participate in the approaching exhibition.

ETTINGER, who wrecked a Baltimore and Ohio train during the July strike, killing two persons, has been found guilty of murder in the second degree and sentenced to 18 years imprisonment.

PROBABLY an order will soon be issued from the Treasury Department for uniforming Custom House employees, though it will depend somewhat on experiments yet to be made in one or two principal offices.

On the 7th inst. four vessels cleared from New Orleans for Liverpool, loaded with cotton, amounting to 25,000 bales, valued at \$1,500,000, the largest shipment ever made in one day from any Southern port.

GOVERNOR CONNER offers the fact that there has been but one conviction in Maine for murder since the abolition of the death penalty, in refutation of the argument that a carnival of crime would follow such abolition.

The Official Gazette of London announces the creation of the Imperial Order of the Crown of India, for ladies only. The order has been conferred on all the Princesses, eight Indian Highnesses, and 18 other persons of distinction.

The grand jury suggests that, as diphtheria is as contagious and as fatal as small pox, a law should be enacted which makes it a penal offense to send children to school out of a family infected with diphtheria. There was in this city 912 deaths last year from this disease.

The Aldermen's Committee for the investigation of New York ring frauds have finished a report. It seems that of thirty millions stolen \$876,000 has been recovered. The committee recommended the prosecution of those who have not given up their stealings, including Oakley Hall.

MR. SWIFT has in the Assembly a bill to prevent the destruction of shrimps and small fish, such as are known to be the usual food for salmon and large fish. His plan is to stop the taking of these small fish to dry them, as is now practiced by the Chinese fishermen, and also to stop the drying of such fish.

It is stated that President Hayes has definitely determined to make the Chinese question the subject of a special message to Congress. In this message he will call attention to present and prospective evils of unlimited Chinese immigration to this country, and will recommend Congress to take such action as in its wisdom may be most proper and effective to restrict and regulate the immigration of Mongolians.

The Supervisors, on Monday evening, on motion of Mr. Hill, adopted the following resolution: *Resolved*, That this Board is opposed to and deprecates any action being taken by the Legislature of this State to compel the employment of any designated number of men at the charge and expense of the taxpayers of this city and county, and hereby respectfully request that all legislative action taken in reference to the relief of unemployed workmen in this city and county shall vest the number to be employed and the manner of their employment in the discretion of this Board.

THE ENGINEER.

A Valuable Map Completed.

A map showing the plans of the primary triangulation of the past season has just been completed by A. D. Wilson, Chief Topographer of Prof. Hayden's geological survey, and will soon appear. The area covered by these triangles extends from Fort Steele, in Wyoming Territory, westward as far as Ogden, in Utah, a distance of about 260 miles, and north as far as Fremont's Peak, in the Wind River range of the Rocky mountains, and includes the Grand Teton, near the Yellowstone National Park, embracing about 25,000 miles. Within this area 26 primary stations have been occupied and their positions computed, so that they are accurately placed on the chart by latitude and longitude. In addition a large number of mountain peaks have been well located, which are to be occupied as points from which the topographical work of the survey will be extended in the future. This work was commenced near Rawlin's Springs, on the line of the Union Pacific railroad, where a base line was carefully measured. From this base the work was extended north and west to the valley of the Bear river, Idaho Territory, where a check base was measured and the work expanded to the mountain peaks to connect with the work as brought forward from the former base. This work has been connected along the line of the Union Pacific railroad at six points with Clarence King's 40th parallel survey. In addition to the importance of this sheet as the base work of this season's topographical work, it presents a most striking feature in the number of remarkably long sights which have been made from the summits of some of the most lofty mountains within the area explored by the survey, many of them being over 100 miles, while some of them reach a distance of 135 miles. From Wind River Peak all the principal points in the Big Horn mountains were sighted, also the lofty peaks of the Uintah mountains—the former located 165 miles to the northeast, while the latter range is situated about the same distance to the northwest, but as these ranges are not within the scope of the present season's work, they will not be given in this chart. This map presents the evidence of a most successful year's field work, when it will be remembered that each primary point is about 14,000 feet high, and as the long air line sights indicate that some of them are from 100 to 165 miles apart, and to travel these distances and climb all points located, shows an extraordinary amount of both scientific and physical exertion, all of which has been most successfully and satisfactorily accomplished.

DE LESSEPS ON THE DARIEN SHIP CANAL.—At a recent meeting of the Paris Academy of Sciences, a paper was read by M. De Lesseps, in which some further particulars are given of the proposed canal across the Isthmus of Darien. The line advocated by Lesseps, starting from the Pacific coast, ascends, in the first place, the river Tuira as far as the Island of Piriaque or Alligators' island. From this point a straight cutting, 16,200 meters long, connects Tuira with Chucunaque near the point where the Tupisa flows into this latter river. The line then ascends the Chucunaque for 14,400 meters; then turning to the northeast, it continues up the valley of the Titi, to a point, where, for reasons of economy it would be preferable to make a tunnel rather than continue deep cutting. This tunnel passes to the south of the peak of Gandi, under the remarkable ridge from which on one side an arm of the Tuquesa, and the Titi flow down toward the Pacific, and on the other the Tolo and Acanti flow to the Atlantic. On emerging from the tunnel the canal continues through an open cutting about ten kilometers long, down the valleys of Acanti and Tolo to the deep waters of port Candi. The probable length of the tunnel is estimated at between 13 and 14 kilometers, and the cost of making the whole canal at 600,000,000 francs.

PERUVIAN RAILWAYS.—The work on the Oroya railway, and that of Cerro de Pasco, together with the drainage of those famous mines, is about to receive a decided impulse in order to arrive at its termination as speedily as possible. The government has at last acceded to the desire of Messrs. Olyphant & Co., relative to the manner in which the stipulated subsidy is to be paid, and a decree is published to the effect that the amount of the subsidy for the first year will be handed over to the representatives of the house in nitrate of soda, at the market price. The first annual subvention is to be paid in three instalments at intervals of four months from October last, on which date the decree referred to was signed.

THE NEW BRIDGE AT ASHTABULA.—Recently Chief Engineer Clark and other officers of the Lake Shore and Michigan Southern railway went to Ashtabula to test the new bridge that had just been completed by the Keystone Bridge Company, of Pittsburgh. This bridge is a Pratt truss and composed of the best iron. The many engineers and practical mechanics who have examined it pronounce it one of the most substantial on the continent, the cost being \$30,000. The test of the bridge consisted in placing six engines upon it at a time, and from these, which weighed in the aggregate more than 390 tons, there was not the least indication of strain. The officers were well pleased with the result of the experiment.

Plants of Tube Wells.

At a recent meeting of the English Society of Engineers, a paper was read by Mr. Robert Sutcliffe, on "Tube Wells for large supplies and in various strata." Mr. Sutcliffe, in his opening remarks, observed that in laying down plant for obtaining large supplies of water, a number of tube wells were coupled together by horizontal mains, so that one pumping engine drew from many tubes. In this way, for the last eight or nine years, the leading breweries at Burton-on-Trent have obtained the bulk of their water supplies. Messrs. Allsop & Sons pump 600,000 gallons daily from 30 three-inch wells, and Messrs Bass & Co. 500,000 gallons from 25 tubes. Thus in one town two breweries are obtaining sufficient water for a town of 40,000 inhabitants. Although some of these Burton wells are within a stone's throw from the Trent, the quality, level and temperature of the water differ from those of the river water. The town of Carmarthen, in Wales, is supplied by 10 two-inch tube wells. In sandy soils strainers or filters are used, which prevent sand coming into the tubes. A tube well was sunk in a very fine sand at Chiselhurst, by pumping up six harrow loads of sand and replacing it with gravel. One advantage of the gravel filter is its imperishability, and if made sufficiently large the velocity of the water is not sufficient to bring the grains of sand within the area acted upon by

ing sands, and the violence of the tidal wave, will be avoided. The canal will consist of a single section of about 17 miles in length, the western outlet of which will be in the Eure dock, at Havre. According to the plans adopted, the canal would have a minimum breadth of 25 meters (over 80 feet), with a towing path six meters wide on each bank. Plans have been adopted for increasing the depth of the channel of the Seine between Paris and Rouen to three meters 20 (10½ feet); a minimum of three meters 50 has, consequently, been fixed for the canal; and as between Havre and Harfleur it is to be accessible for brigs, schooners and steam colliers, the depth in that portion will be increased to four and one-half meters. The cost of the work is estimated at 21,000,000 francs, including all accessory works, the planting of the banks with trees, the construction of a branch, 500 meters long, to connect the port of Harfleur with the canal, and a basin of 500 meters by 60 meters at Havre.

Scientific Smelters.

A great many people sneer at what they call scientific smelting, and claim that no one is competent to take charge of a furnace except a man who has been educated at the front, and has done all the work from feeding to wheeling slag-pots. No doubt but this knowledge is of

Rainfalls Before and After January 1st.

We are indebted to Prof. G. F. Becker, of the Department of Mining and Metallurgy at the State University, for the interesting diagram on this page, showing the relation between the amount of rain falling before and after January 1st, in each year since 1849. The method which prevails in the plotting is described in a note from Prof. Becker, which we print below. It will be noticed that heretofore an average of two-fifths of the rain of the fiscal year has fallen before January 1st. While this would give us a rather light total rainfall this year, if it conformed to the average, it is also shown in the diagram that wide departures from this rule have occurred in single cases heretofore, and we trust may occur this year. The study of our rainfall is a practical one, and we are under obligations to all scientific observers who give us data for pursuing it. Prof. Becker's note in relation to the diagram is as follows:

EDDERS PRESS.—To what extent the rainfall before the first day of January is proportional to that of the whole season, is a frequent subject of discussion and is a matter of great practical importance to the State. When Mr. Tennent published his valuable figures on the subject in the *Bulletin* of a few nights since, it occurred to me that it would be interesting to give this relation of the partial rainfall to the total in a graphic form, and in such a manner that the general proportionality, if it existed, and the relations for each year, would be apparent at a glance.

I make the following division of the rainfall in each year:

Rainfall in San Francisco.*				
YEAR.	BEFORE JAN. 1.	AFTER JAN. 1.	TOTAL.	
1849-50.....	18.00	15.10	33.10	
1850-51.....	2.30	6.10	7.40	
1851-52.....	10.46	7.98	18.44	
1852-53.....	10.31	15.95	26.26	
1853-54.....	5.22	18.65	23.87	
1854-55.....	3.72	19.06	22.78	
1855-56.....	6.03	15.63	21.66	
1856-57.....	7.08	12.73	19.81	
1857-58.....	8.13	13.75	21.88	
1858-59.....	9.78	12.44	22.22	
1859-60.....	8.95	22.27	31.22	
1860-61.....	7.36	11.86	19.22	
1861-62.....	13.66	35.61	49.27	
1862-63.....	2.30	10.72	13.02	
1863-64.....	4.33	5.70	10.03	
1864-65.....	15.04	8.79	23.83	
1865-66.....	5.27	17.66	22.93	
1866-67.....	18.62	16.90	35.52	
1867-68.....	16.34	22.50	38.84	
1868-69.....	5.67	15.63	21.30	
1869-70.....	6.91	12.40	19.31	
1870-71.....	3.80	10.30	14.10	
1871-72.....	20.60	14.11	34.71	
1872-73.....	10.22	7.80	18.02	
1873-74.....	12.21	11.77	23.98	
1874-75.....	9.01	9.39	18.40	
1875-76.....	10.03	15.98	26.01	
1876-77.....	3.21	6.79	10.00	
Grand total.....	265.61	392.92	658.53	
Ratio.....	2	to	3	to 5.

*According to Tennent. Regent Davidson, nearly five years since, plotted Mr. Tennent's figures for the purpose of discussing the periodicity of the rainfall, but not in such a manner as to bring this special relation into prominence. In the accompanying diagrams each perpendicular line represents a winter from the year 1849, on. The horizontal lines represent inches of rain and the distance from the base or zero line, at which each curve crosses the vertical line appropriate to any year indicates the amount of rain which fell in San Francisco during that year. The three diagrams represent respectively the rainfall before the first of January, after the first of January, and the total rainfall. The scale of years is continuous and is the same for all the curves; the scale representing inches, on the other hand, is different for each and is inversely proportional to the amount of rain which has fallen during the period covered by the diagram. The consequence of this selection of scales will evidently be that if the amount of rain falling before the first of January were simply proportional to the total rainfall for the season, and if, in each year, just two-fifths of the rain came before January 1st, the three curves would be identical. Hence, their variation expresses exactly the limits within which this rule applies.

As your readers are interested in the weather, perhaps some of them may find this chart a convenient record of the past. G. F. BECKER.

University of California, Dec. 20th, 1877.

CHANCE OF DEATH BY TRAVEL.—It takes the French to get up statistics. One of their learned men, skilled in that line, has demonstrated the great improvement which has taken place in the safety of travel in modern times. He says that in the old diligence days a man had one chance of being killed in 300,000 trips and one chance of being injured in 30,000. On the railway, between 1835 and 1855, there was one chance of being killed in 2,000,000 journeys and one chance of being injured in 500,000. From 1855 to 1875, one chance of being killed in making 6,000,000 journeys and one chance of being injured in 600,000. Now the chances of being killed are as one to 45,000,000 and of being injured one to 1,000,000. Consequently, a person traveling 10 hours a day at the rate of 40 miles an hour, would, in the first period, have a chance of escaping destruction during 321 years, during the second period during 1,014 years, and between 1872 and 1875 during 7,439 years.

Vertical Scales Inversely Proportional to Grand Totals.

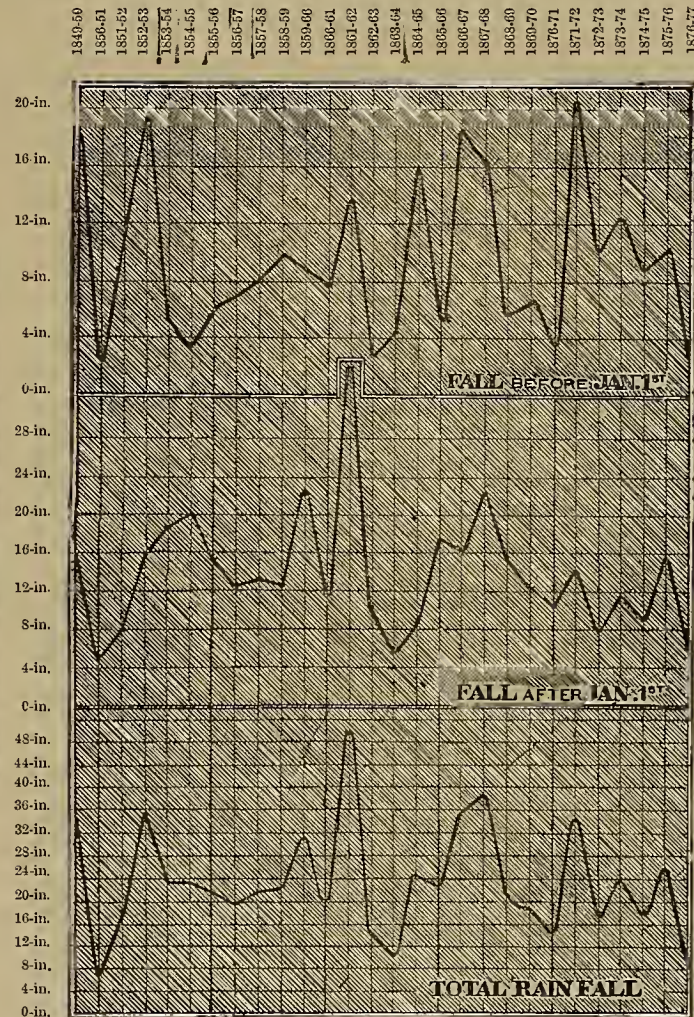


DIAGRAM SHOWING RAINFALL BEFORE AND AFTER JANUARY 1st.

the pump. The author observed that in rocks or other hard strata the method of sinking tube wells was similar to that employed in making artesian borings, but the mode of pumping and development of supply was entirely peculiar to the tube well system. Bored wells can be made through any stratum and to any depth that an ordinary artesian boring can reach. The Lower Grounds, Birmingham, with their ornamental waters, fountains, and extensive gardens, derive their entire water supply from a single five-inch well sunk to about 200 feet deep. By means of this well an annual saving of about £300 for water rate is effected. Two tube wells at West Thurrock yield a daily supply of of 220,000 gallons from the chalk. In conclusion, the author observed that it was said that the first tube well was a pointed bamboo driven into the earth, and the pump a "higger," who sucked the water through the pores of the cane. Now, said Mr. Sutcliffe, factories, breweries and towns derive from them enormous supplies, and it is possible that coupled tube wells in the chalk may solve the problem of providing London with pure water.

NEW FRENCH MARITIME CANAL.—Preliminary formalities are being carried through at Havre, France, for the construction of a maritime canal from that port, touching at Harfleur, and joining the Seine at Tancarville, a point on the river about 60 miles below Rouen. By means of this canal the dangers of the navigation of the lower Seine from fogs, the shift-

great utility, but there are many things necessary beside. The ore varies in its constituents, one hatch carrying a larger proportion of silica, another of iron, while a third may be impregnated with base metals of a refractory nature. Here it is where scientific training comes into play, and if united with practical knowledge so much the better. An instance of the truth of the above is shown at a certain furnace in Eureka. For the past year the profits have been nothing; in fact, the smelting operations have not paid expenses. Some two months ago a gentleman who united a scientific training with a practical knowledge of the work, took charge, and since that time, from the same ores, the excess of profits over expenses has reached the sum of \$20,000 per month. We know of several other instances of the same nature, and we only refer to the above as an illustration of the worth of science. If our ambitious smelters would devote their leisure hours to the acquirement of a knowledge of the chemical constituents of ores, their fluxes, etc., they would command not only higher positions but their services would become indispensable to the mine owners of the Base Range.—Eureka Sentinel.

THE State Savings Bank at Indianapolis has obtained authority from the Auditor of State to surrender its charter and go into liquidation. The assets are sufficient to cover all liabilities. Twenty-five per cent. will be paid to depositors at once and the balance within six months.

Sapping Life and Strength.

In our opinion nearly all schemes to defraud people of their surplus savings become comparatively innocent beside the insidious crime of making money by the debasement and adulteration of human food. Swindling schemes to steal surpluses may produce almost indescribable disappointment, and in some cases actual bodily suffering, but the evil is small compared with that of day by day, and hour by hour, sapping the life and strength of the community by lessening the nutritive power of the foods upon which we rely to arm and nerve us for the burdens of life. He who in the place of bread sells us something as worthless as a stone and perhaps as dangerous as a scorpion, deserves a degree of punishment far weightier than he who steals our purse. It is an absolute need that the public should protect itself against the practices of rascally adulterators of food supplies whose work is becoming so general and so bold. We have urged before our convictions on this point and we can but reassert them, with increased force, now that the Legislature will soon have measures for the protection of the people's food before it for consideration. We are squarely and fully on the side of the people in this matter. The need seems apparent enough. Other countries and other States have passed enitable laws for examination of foods offered for sale, and the examinations which have been made by competent inspectors show that the extent of adulteration and the range of substances assailed by the debaser are far beyond anything which had been imagined. The methods of examination are plain enough, thanks to the progress of science. The test tubes of the chemist and the microscope, when in competent hands, give evidence such as the courts freely recognize, and when inspectors are competent and penalties severe, the remedy through the law is ample for the public protection.

We notice that there is now before the Legislature a proposition for the appointment of a salaried milk inspectorship in this city. The idea is an excellent one, providing it is honestly urged and the office is not created merely to give a salary to some one. We know very well from our own examination and analysis of the milk which is often offered for sale in this city that we have found many samples in which at least one-quarter was worthless foreign material. The yearly expense of maintaining an inspector could be saved each week at least, if he were a competent man whose testimony the courts would recognize; and an active man, whose presence in every place would strike terror to the hearts of the debaser. If these can be assured we should advise the creation of the office forthwith, not only for the strength of the city's men and women, but also to save the lives of thousands of children from the wretches who furnish them innutritious or unhealthy milk.

But not alone to the dweller in the city are safeguards against the adulteration of food material requisite. The tons of supplies which are taken to the country and form a part of rural cookery and table furnishing are all liable to the frauds of evil minded manufacturers. There should be some means of discriminating between the evil and the good, of punishing the evil and transferring patronage to the good. We are glad to see that the State Board of Health has brought up this topic anew in this year's report, and we trust their recommendations will be heeded by the law makers. In the report we find an article by Dr. J. F. Montgomery, of Sacramento. Among other things the writer makes the following note of articles in which adulterations are practiced:

Of the foods, some of the articles recently mentioned as being most frequently adulterated, are tea with sand, powdered quartz, Prussian blue, exhausted and decayed tea leaves, as well as other leaves or husks, and various other substances, many of them injurious to health; coffee, to the extent of from 30% to 80% of chicory, besides powdered beans and many other ingredients; bread, with alum, to conceal the had quality of flour to an extent to damage health, and also, in some instances, with marble dust and other impurities, to cheapen its production or manufacture; butter, with foreign fats, some of them of vegetable origin, from 50% to 85%, and some samples without any butter at all, and milk with water from 20% to 50%, and deficient besides; in cream or butter fat.

The condiments, too, as a general rule, are more or less adulterated. Mustard, for instance, is very frequently adulterated, mainly with corn, wheat and rye flour, and turmeric, sometimes to the extent, in the aggregate, of 90% of impurities.

Of drinks, the alcoholic, vinous, and fermented are all very much adulterated, or tampered with in some way. Some specimens of whisky have been found to contain a sufficiently large quantity of fusel oil to render it liable to produce insanity, among other injurious effects. Then, again, some specimens, besides other poisonous ingredients, contain sufficient quantities of sulphuric acid to cause serious damage to the stomach and to the system generally. Some of these specimens, indeed, had barely a trace of real whisky. Wines are notoriously adulterated or mixed, apparently with the sole view of enriching the manufacturer or dealer, with-

out any regard to the effect the pernicious compounds may have on the health of those who may partake of them.

Nor are drugs or medicines allowed to escape the polluting touch and the vile manipulation of the dishonest adulterator, although, upon their purity and efficacy the life of the sick and suffering often depends, and without the purest quality of which the most skillful physician is often thwarted in his efforts to minister to the needs of the afflicted, and is thus rendered powerless.

USEFUL INFORMATION.

GRANULATION.—The process of reduction by granulation is adapted to the metallic substances. The metals are acted upon by being fused in a crucible, and then pouring the melted matter from an elevation very gradually into cold water, which must be kept constantly agitated by stirring. The fineness of the resultant granules is proportioned to the slowness with which the fused metal is poured into the water. Iron is brought to a powdered state, mechanically by the file, and chemically by reduction in an atmosphere of hydrogen gas. The noble metals, in a state of foil may be pulverized by rubbing up with honey, when the addition of boiling water solves out the medium without action upon the metallic powder, which then only requires to be thrown upon a filter and dried. Phosphorus may be divided by fusing it with alcohol over a water bath, and shaking the contents of the flask until thoroughly cooled. The phosphorus subsides at the bottom in pulverized form.

Gum camphor, which is obstinate under the pestle, readily yields when a few drops of alcohol or ether are added, which destroy its elasticity. Silver is obtained in powder by the decomposition of its nitric solution with a metallic copper rod, or of its chloride by metallic zinc. Potassium of iron throws down gold in a finely divided state from the solution of its chloride, and spongy platinum is formed by the dull ignition of the ammonia-chloride of that metal. The process of sublimation which we have already treated of, shows instances of chemico-mechanical division, the vaporized particles being prevented from reunion at the moment of solidification, by the intervention of cold air.

ATTACHING WAGES.—Judge Stowe, of Pittsburgh, has announced a new rule of practice governing the attachment of wages. The case was that of George Miller vs. George Rush, in which wages in the hands of Singer, Nimick & Co., garnishees, were attached. A rule was asked to show cause why the attachment should not be quashed. The Court says: "There is, perhaps, no other class of cases in which it is so necessary to adopt a summary proceeding as this. The law is that the laborer shall have his wages to live and support his family upon, without being liable to have them seized in execution for his debts, and courts should, as far as possible, see that this object is secured and the law so administered as best to reach the result intended. To allow wages to be attached, and then compel the laborer to wait for months, and perhaps for years, to get a trial before a jury on facts which are not disputed, is clearly wrong, and undoubtedly should not be permitted if it can be avoided. We think the court has a right to and can establish a practice to secure the end proposed, without infringing the right of trial by jury. We have, therefore, come to the conclusion that hereafter when wages are attached, as in this case, we will quash the attachment as to them, permitting it to stand so far as other debts, if any not exempt, are concerned. But whenever the allegation that the debt attached is for wages, is properly traversed under oath, we will refuse to quash, and require the cause to go to a jury to determine all questions of facts involved."

REFUSING PASSAGE TO A DRUNKEN MAN.—In a recent case the Indiana Supreme Court holds: A railroad company is not bound to receive any person as a passenger who is drunk to such a degree as to be disgusting, offensive, disagreeable or annoying; and a person so drunk as to be likely to violate the common proprieties, civilities and decencies of life has no right to passage while in that condition. The comfort and convenience of passengers generally must be protected, their opinions and feelings regarded, and a proper decorum observed. Although in a railroad passenger car neither the highest breeding of the drawing-room nor the fastidious delicacy of the parlor is required, yet the behavior of all persons therein should be becoming the place and the general character of the passengers. Slight intoxication, such as would not be likely to seriously affect the conduct of the person intoxicated, would not be sufficient ground to refuse passage in a public car, although the persons behavior might not be in all respects strictly becoming.

TEMPERING THIN TOOLS.—To temper files, ratchets, etc., the best method is to heat them to a red heat, according to the nature and quality of the steel, on a small iron shovel, and to turn the piece on to a plate of steel or iron, which is at least a centimeter in thickness; then cover quickly with another plate of the same thickness. If the operation is well performed a very good tempering will be obtained.

DOSE FOR RATS.—A writer to the *Rural New Yorker* says: My method of ridding myself of rats in the cellar, or about the house, is to take a quantity of refined potash, (I use Babbit's) partially pulverize it, moisten it with water, so that it will form a sort of paste, and daub this about the bottoms of their holes and run-ways, so that they are compelled to step in it, in entering the premises. I have practiced this method for several years, with very satisfactory results. If the first application is not sufficient, it can, of course, be repeated with but little trouble or expense, and I am confident of favorable results. Such, at least, has uniformly been my experience since I first adopted the method, many years since. The theory is, the rats step in the moistened potash while entering. Its caustic nature produces a smarting sensation in the feet. He at once proceeds to lick his feet to alleviate the pain. The consequence is, a not-very agreeable sensation in the mouth. He is compelled to renew the application in going out—result, he does not care to renew his visit, and probably imparts good counsel to his associates, and the rat nuisance is at once abated. I prefer this method to the use of phosphorus, or any of the "rat poisons" recommended, as it is not always safe to have the latter around, and we have no dead rats left in the walls or other out-of-the-way places to infect the air with their offensive odors.

HOW TO CLEAN ENGRAVINGS.—A correspondent has recently succeeded in cleaning some engravings by the following process: Soak the print in cold water till all creases are out and it lies quite smooth; then put into a dish containing a solution of chloride of lime with twice its quantity of clear cold water. When the stains have disappeared, put the engraving into plain water, and afterwards dry with blotting-paper. For the solution referred to, put half a pound of chloride of lime into a vessel with one pint of water; let it stand, stirring it now and again, for 24 hours, and then strain it through fine muslin till quite clear, when the liquid is to be added to one quart of water. The prints should not be left in the solution longer than is necessary to remove the stains, and the more thoroughly they are washed in cold water afterwards the better for them; for, if any of the bleach is left in the paper, it is liable to rot and destroy it. The wet print requires care in handling.

CONTINUOUS OIL DISTILLATION.—The *Cleveland Leader* says: At the works of the Republic Refining Company, recently, Mr. H. C. Rose, President of the company, gave a very pleasant exhibition of his new process, which has attracted already considerable attention from the scientific press. The apparatus accomplished in six minutes what in the old way occupies twice as many hours, reducing 32 gravity crude to 26 gravity, and separating the various light oils instantaneously. The employment of the steam process in connection with the apparatus patented by Mr. Rose resulted in the quite extraordinary result of 26° oil of zero test. It is probable that in this apparatus we have in Cleveland a new and useful improvement in the methods of making lubricating oil from crude petroleum.

GOOD HEALTH.

The Pernicious Habit of Drinking.

An English physician, Dr. Duckworth, writes as follows: "Medical men may fairly tell the healthy, robust, well-fed and well-housed to give up stimulants if they fully maintain their health without them. Total abstinents are generally large eaters, and the ultimate textural effects of excess in eating or drinking, if any, may not be very dissimilar. I think it is proved that the addition of a little alcoholic food to a meal secures a more moderate ingestion of solids, and where it agrees, which it does not always, promotes a more satisfactory digestion of them. But a large number of persons suffering chiefly from dyspepsia or insomnia are better without stimulants of any kind. A daily allowance of alcohol is manifestly wrong; more to-day and less to-morrow may be needed or instinctively called for. The rational individual must honestly and conscientiously find out for himself what the special needs of his system are, and where a right-minded christian individual is in earnest in such a matter and has a proper control over his appetite, he is not likely to go far wrong in the matter of stimulants.

"Medical men should urge teetotalism upon the nervous classes of drunkards, persons who are careless and self-indulgent or who by their lives or callings are much in the way of drink. Stimulants should be always taken at meal times, and only then.

"I am confident that, as a body, our profession is unanimous in condemning the modern American habit of taking odd glasses of stimulants at all hours and lamenting the grievous multiplication of the means of gratifying this mischievous custom, for truly the conduct of masses of young business men in our cities and large towns in this respect is becoming disgraceful and the practice is fast gaining in other circles and communities. Our countrymen of these classes have no excuse for this, for they are well-fed and have liquors with their meals in addition to their hourly drinks, while Americans, who are notoriously the worst dietitians in the civilized world, are water-drinkers at meal time."

The Wholesomeness of the Orange.

Julia Colman, Superintendent of the New York cooking school, gives the *Phrenological Journal* the following: Not a few of those who wish to be careful as to the quality of their food have doubted the wholesomeness of the orange as it is found in the markets. A fruit, they have said, which is picked so green and kept so long can not be very desirable food. These queries, however, have mostly died away before the experimental proofs of its wholesomeness. Invalids and all sorts of well people eat of it freely without known ill effects. Many have gone to the other extreme and attributed to it health-giving properties, which they deem almost marvelous. For example, it is said to be a sort of insurance against disease to eat two oranges before breakfast for three months in the spring, say from March to May inclusive. We admit that such a course, if generally pursued, might turn many doctors out of employment.

Another prescribed use is to cure a longing for alcoholic drinks. The sufferer must eat an orange the first thing in the morning. We have faith in the remedy, so far as it goes, but to make it effective the subject must earnestly desire to give up the drink, he determined to do so, and then the orange will be a natural help to quench thirst, to aid in healing the stomach and to induce a wholesome tendency in the system generally. This much ought to be understood to prevent any one from supposing that it acts like a charm or philter to take away the unnatural craving. That will return again and again for some days, and if the subject understands this, instead of being discouraged, he will take another orange, and calling all the moral and social aid he can command to his help, he will be much more likely to succeed.

If in hot, unhealthy countries generally, men would eat an orange in place of drinking a glass of gin, brandy or other alcoholic liquor, the result would be most advantageous. And if some juicy fruit were eaten always in place of taking unwholesome water or any other drink whatever, the malaria of the worst localities might become almost harmless. If the water he wholesome, oranges or other fruit juice mingled with it make it very much more satisfactory, both in taste and results. If we took half the pains to provide ourselves with fruits that we do to provide ourselves with alcoholic drinks, we should soon see a beneficial change on the face of affairs.

EXPERIMENTS WITH THE TURKISH BATH.—Some interesting observations were related at the last meeting of the British Medical Association, by William James Fleming, M. B. (Glasgow). These experiments were performed by the author upon himself, and consisted of observations on the effect of the Turkish bath at temperatures of from 130° Fah. to 170° Fah., upon the weight, temperature, pulse, respiration and secretions. The results showed that the immersion of the body in hot, dry air, produced loss of weight to an extent considerably greater than normal, amounting, on the average, to the rate of about 40 ounces an hour. This was accompanied by an increase in the temperature of the body and a rise in the pulse rate, with at first a fall and then a rise in the rapidity of respiration. The amount of solids secreted by the kidneys was increased and coincidently the amount of urea. The sweat contained a quantity of solid matter in solution and among other things a considerable amount of urea. The most important effect of the bath was the stimulation of the emunctory action of the skin. By this means the tissues could, as it were, be washed by passing water through them from within out. The increased temperature and pulse rate pointed to the necessity of caution in the use of the bath when the circulatory system was diseased.

BORACIC ACID FOR SKIN DISEASES.—Surgeon Major Watson reports in the *India Medical Gazette*, that he has lately employed boracic acid with very great success as an external application in the treatment of dermatophyta, or vegetable parasitic diseases of the skin. He was, it appears, induced to try this remedy from witnessing its employment as an antiseptic in the Edinburgh infirmary wards. The diseases in which he has hitherto used boracic acid have been the various forms of tinea, especially that very troublesome form of the disease which affects the cranium and inner sides of the thighs of many Europeans in India. Dr. Watson declares that the external application of a solution of boracic acid acts like a charm in such cases. An aqueous solution of boracic acid of a drachm to the ounce, or as much as the water will take up at ordinary temperature, is employed. The affected parts, he says, should be well bathed with the solution twice daily, some little friction being used, and it should not be wiped off, but allowed to dry on the part. Altogether, he regards it as preferable to all other remedies of the same class.

AN AFRICAN RAILWAY.—In the United States Senate, on the 7th ult., Mr. Conkling (New York) presented a petition of Austin Packard and others, of New York, in favor of the appointment of a commission to communicate with other nations with a view of having a railroad across the continent of Africa.

A NUMBER of outside mines in Nevada have been jumped because the necessary amount of work was not done on them during the year 1877.

MINING SCIENTIFIC PRESS

W. B. EWER.....SENIOR EDITOR.

A. T. DEWEY.....W. B. EWER.

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SAN FRANCISCO:
Saturday Morning, Jan. 12, 1878.

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The Week.

We have been visited this week with another rain, which keeps alive the hope that we will still have plenty this year, and not have to stand the disastrous consequences of another dry season. News from the sections where the hydraulic mines are situated represents that they are nearly all tied up for want of water, and are anxiously waiting and expecting to start up work. In many places, also, quartz mills have had to bang up their stamps for lack of water. One good old-fashioned storm, which would reach all over the State, would be worth millions to us all. The news of the week from the seat of war indicates early peace, Russia having rather the best of it. Nothing very important has happened in mining circles, except the striking of ore in the Alta, and it is undecided yet whether the ground belongs to that company or the Justice. The honanza mines are sending out unusually large shipments of hulsion, which we sincerely hope they will keep up. More ore is beginning to come up from Arizona, most of it very rich. Next year this section of the country will have an opportunity to prove the abundance and richness of its mineral deposits, or it will disappoint its many friends.

Investment of Savings.

We see by the dispatches from Sacramento that there is some lobby opposition to the scheme of appointing a Bank Commissioner or any other plan which shall interfere with the present working of the savings banks. In the present state of feeling there is no doubt but that some plan must be devised to protect depositors in savings banks, and give them an opportunity of knowing what is done with their property. The people want the present system remedied, and it is probable that lobby opposition will be in vain. If no better guarantee can be given than the fact that the bank has offices, officers and a tray or so of coin on its counters, the people will soon give up having anything to do with savings banks and look for other places to put their money. A certain class of people have not time to look out for investing their savings, or the business knowledge necessary to do so. Accordingly they put them in savings banks. Unscrupulous men have taken advantage of their positions as managers of such institutions to walk off with the money entrusted to them and the depositors have no redress.

It remains with the representatives of the people to enact such laws as shall prevent any opportunity for stealing or making away with the depositors' money. No bank should be allowed to do business for two or three years right along without a representative of the depositors having a right to enquire how business was conducted. The failure to have such examinations made has resulted disastrously here and elsewhere and it remains with the Legislature to devise some plan for preventing the people from being swindled. We have some good banks and we have had some bad ones, but the depositor never knows the bank is bad until it is too late to get out his money.

The Government is becoming aware that the people desire a means of investing their savings where they will be perfectly safe, and we notice that at a Cabinet meeting, on the 8th inst., it was determined that the Secretary of the Treasury should, as soon as practicable, invite further subscriptions to a loan of 4% bonds, and so conduct it that all subscribers in all parts of the United States shall have a full and easy opportunity to subscribe to bonds of any amount authorized by law, through national banks and banks of established credit, and to give every facility allowed by law to convert postal orders, certificates of deposit, etc., and where necessary, sell coin to facilitate subscriptions, and to favor any legislation that Congress might see fit to adopt to promote the deposit of savings for the funding of the national debt.

Academy of Sciences.

The annual meeting of the California Academy of Sciences was held on Monday evening last. The election took place during the day, with the ordinary result: President, Prof. George Davidson; First Vice-President, Henry Edwards; Second Vice-President, Henry C. Hyde; Recording Secretary, Charles G. Yale; Corresponding Secretary, Dr. A. B. Stout; Treasurer, Elisha Brooks; Librarian, C. Troyer; Director of the Museum, W. G. W. Harford. Trustees: Gen. David D. Colton, Col. George E. Gray, Robert E. C. Stearns, Thomas P. Madden, Gen. John F. Miller, William Ashburner and Ralph C. Harrison.

Prof. Davidson was prevented by illness from attending the meeting, so no annual address was read. Mr. Henry Edwards occupied the chair.

The following was read by the Secretary: "The Council of the Academy have unanimously agreed, in exercising the privilege granted them by the Constitution, of nominating for honorary life-membership at the annual meeting such persons as have performed valuable services to the Academy, to present the name of Prof. George Davidson."

The nomination was unanimously endorsed by the Academy.

The report of Mr. Troyer, Librarian, showed that the additions to the library for the year numbered 600, including 365 foreign works.

Henry Edwards read a report of the Botanical Section, of which he is President, showing its work for nine months. The section comprises nine regular and two corresponding members. Their list embraces 536 species and 1,300 specimens of the flora of California and neighboring States. The work of this section has been prosecuted vigorously and effectively, and proves the soundness of the policy which seeks to sectionize the work of the Academy.

The report of the Recording Secretary, Mr. Yale, shows that the Academy gained nine resident members during the year and three life members. Sixteen members were dropped from the rolls for non-payment of dues and five resigned. The present membership consists of 82 life members and 268 resident members, making a total of 350 members. The average attendance has been 20 members.

W. G. W. Harford, Director of the Museum, read a report giving details connected with the various departments under his supervision. Dr. Kellogg, Curator of Botany, also read a report. Owing to some still unsettled financial matters, no report of the Board of Trustees was read, but will be presented at the next meeting.

Annual Expenditures on Claims.

There have been a good many claims jumped during the past 10 days in the different mining camps on this coast. They were not exactly "jumped," either, in the old acceptance of the term, for they have been re-located according to law, the rights of original miners having been forfeited for non-compliance with the provisions of the United States statutes, requiring an annual expenditure. There is no doubt but that the plan works well. Under the old system, unless the local laws provided for certain annual work, a man could locate a claim and let it lie idle for an indefinite length of time, so if anything near it developed into a good mine, this claim also would be worth something. The system was poor, because it tied up a lot of ground which the owner would not and others could not work. Now a locator has got to show his intention of doing something with his claim or the law gives it to some other man.

True, the expenditure required is comparatively small, but it is nevertheless large enough to make people drop a good many claims every year. A man owning a dozen or so claims on different parts of the coast finds the tax a burdensome one, perhaps; but still he ought to be made to develop such claims or give them up to some one who will. The law prevents, practically, one man holding too many claims, and is really better for the working miners than any before framed. The real practical miner or prospector, who intends doing something with his claim, can easily do enough work to hold it, while the speculator in claims must expend hard cash to cover the required expenditure. The law prevents any dog-in-the-manger speculator from holding on to 20 or 30 different claims without spending any money, and thereby keeping the practical miner, who would work them, away from the ground.

Taken altogether, the provision requiring annual expenditures on mining claims is a very good one for the mining interests of the country, although it may occasionally work a temporary hardship to deserving individuals. If a man cannot spend \$100 a year in keeping a mine, it is not probable that he will do much to develop it, and it should as soon as possible fall into the hands of those who will utilize the ground.

DEATH OF SENATOR PORTER.—The Hon. Nathan Porter, State Senator for Alameda county, died suddenly at Sacramento on Sunday. Senator Porter was well and favorably known throughout the State. He arrived in California in 1854. He was a law partner of the Hon. E. D. Sawyer for several years, and was at one time District Attorney in this city. He was also a law partner of Samuel Holladay for a number of years. He was a prominent Odd Fellow, having taken all the degrees, and represented California in the Grand Lodge of the United States for the past two years. He was an able orator, a ready debater, a fine criminal lawyer, a good citizen and a conscientious and upright man, and leaves a legion of friends to mourn his loss. The Senate and Assembly both adopted appropriate resolutions and adjourned over, out of respect to his memory. Resolutions were also adopted by the San Francisco Bar, and the courts adjourned on the announcement of the death. The funeral obsequies in this city on Wednesday were conducted by the Odd Fellows and were very impressive. Deputations from various lodges, members of the Legislature and the Bar attended the funeral.

THE NEVADA BANK.—The fourth semi-annual statement of the Nevada Bank, in compliance with the State law, has been published. The gross assets of the statement amount to \$19,708,400. The cash on hand is \$4,178,600, and bullion \$318,600. In addition to cash and bullion, the other assets at the close of 1877, consisted of \$6,962,600 for bills discounted at San Francisco, \$740,000 for bills discounted at Virginia, \$3,725,400 for advances against bullion, \$2,644,800, for United States bonds, \$1,000,000 in real estate, and \$138,400 in sundry accounts. Six months ago the bank had \$3,047,500 in United States bonds, against \$2,498,000 a year ago. The amount in real estate is the same as it was a year ago. The Nevada Bank was established October 4th, 1875, with a paid up capital of \$5,000,000. At the end of the first year of its existence the capital was doubled, Flood & O'Brien drawing a check for the additional \$5,000,000. The paid up capital is \$10,000,000. Of this Flood, O'Brien, Fair and Mackey, have each 23,750 shares valued at \$2,375,000 for each lot, and Louis McLane has 5,000 shares, valued at \$500,000. The bank has the largest paid up capital of any in the United States. The current deposit account on December 29th was \$5,770,100 for the city, and \$1,000,000 for Virginia City, or \$6,770,100 as a total.

The report of the Superintendent of the Life Saving Service shows that there have been, during the year, 134 disasters to vessels within the limits of the operations of the service. On board those vessels there were just 1,500 persons. The estimated value of the vessels was \$2,000,000, and of the cargoes \$1,500,000. The number of lives saved was 1,461, and lost, 39. The amount of property saved was \$1,750,000 and the amount lost was \$1,500,000.

The Necessity for a Physical Survey of California.

[Read before the Academy of Sciences by Prof. Ozo. Davidson.]

The subject matter of the few remarks which I shall offer for your consideration this evening is not strictly new to you. On more than one occasion this Academy has expressed its views upon the necessity for a thorough and exhaustive survey of this State, and not only of the State, but of the States and Territories adjacent thereto.

Whatever has been partially done has its value and its usefulness; but it is now a necessity that a more comprehensive system should be inaugurated, which will embrace every field of enterprise and investment.

I do not propound this necessity from theoretical or abstruse considerations, but upon the plainest, strongest demands of utilitarianism. Do not misunderstand me as ignoring science in such a work, on the contrary it is only upon the clearest deductions of observation and research, conducted by scientific methods, that the greatest gains and advances can be made in everyday practical life. When the practical man raises huge beams, and structures, and volumes of water by the application of the lever, or the pulley, or the pump, he is simply utilizing knowledge; and all of the so-called "practical" that is effected by rule of thumb, without an adequate and probably unrecognized basis of knowledge, is done at a dead loss of work, which is capital, and of time, which is profit.

I repeat, that every great industry on this coast is largely and directly interested in the subject of a physical survey of the State, and the humblest trades and professions are therefore certainly and intimately affected, and affected favorably.

The great mining interests, in the precious and base metals, in coal, building material, etc.; the millions of money and thousands depending upon the success of agricultural investments; the large capital bound up in manufacturing and commercial enterprises; the steamboat and railroad undertakings, involving so much of wealth and comfort, and rapidity and certainty of traffic; the enormous sums locked up in landed property throughout the country; all these fail to attain their legitimate proportions and security when insufficient knowledge hinders and balks their development. And all of these interests are so interwoven and so inter-related that one cannot suffer without the remainder becoming nervous and enervated by sympathy.

I do not pretend that a physical survey of this State will afford a panacea for the commercial distress and the agricultural dismay that cloud our souls to-day, but I do positively assert that such a survey, if completed and its deductions honestly acted upon, would, for instance, have enabled us to avert much of the distress arising from the failure of our crops, and ramifying every artery of trade. It would lead to a guarantee for the safe and permanent investment of every man's means, and of the labor of his hands, and the wit in his 10 fingers, if his capital be nothing more. Those who have invested their money in operations based upon insufficient knowledge, know to their sorrow that it might have been much better employed, had proper data been available.

The development of the agricultural and mineral resources of this State has satisfied those who reflect upon the intimate relation necessarily existing between the uniform production of the country and the general prosperity of the population; that a higher and a more difficult problem is offered for our solution than the patient and anxious waiting for the rains of heaven to supply the fertile land and the forests with water, and the mountain streams with their quantum sufficient for mining purposes.

We may assert it as a dictum, that the agricultural prosperity of this State has reached its maximum without recourse to artificial means of supplying water to the soil. This is not an impromptu *ad captandum* assertion, but the deliberate and painful conviction following an intimate, earnest, and prolonged acquaintance with nearly the whole territory of the Pacific seaboard; and as the solid foundation of a State's prosperity and population is mainly in and related to her agricultural wealth, we must also conclude that, without unexpectedly favorable influences, the population of the country will becometh but slowly increase.

Our State has an area equal to that of Spain, but a population only one twenty-fifth as great. We have a great valley that would support 5,000,000 of people, and during this year its sparse population has been almost in despair. Millions of acres of land have remained untilled or have borne no crop; hundreds of thousands of animals have perished, and yet the rivers have been running to the ocean, the life-blood of this State has ebbed without imparting a spark of vitality, the green places are parched and arid. I refer to the agricultural phase of the problem because it is brought home so painfully and directly to hundreds of thousands of our people, to the whole population indirectly. I mention it because the solution of one part of it seems so readily understood; we are not standing still for want of the necessary skill to accomplish what is sought; but each and all seem waiting for some supernatural interposition to bridge them over the rainless years.

What will this physical survey give to the

State? When shall it be undertaken? How shall it be carried on? Will its cost be excessive? These and a hundred correlative questions may readily be propounded, and yet to each I am convinced that a satisfactory answer can be given.

Let me answer the main question that must arise in many minds. *Qui bono?*—of what good is it?—by asking another and analogous question. Of what good has been the survey of the Pacific coast of the United States? The mapping of its outline, its dangers, its harbors, its islands; the establishment of light houses, fog whistles, buoys and other aids to navigation; the knowledge of the currents and winds, and climatology; the variation of the compass and its secular changes and local peculiarities; the geographical position and elevation of thousands of positions; the marked peculiarities of the tides, whereby they are closely predicted for years in advance, and a multiplicity of other information that daily and hourly has its practical application in a hundred ways. To-day no seaworthy vessel need go ashore that is honestly found and manned, and properly handled. As a consequence the insurance has decreased, and should be far less upon this coast than upon the Atlantic and Gulf seaboard. The loss of life is necessarily diminished, and all commercial ventures depending upon regularity of passage must profit from the knowledge acquired. The partial information, early made known, of the great currents of the north Pacific, and their effects upon the weather, solved the question against the great circle route from San Francisco to Yokohama, or even to Hakodadi; even if the commercial advantages of the steam route to China through the warmer and more agreeable latitudes had not been shown to outweigh any merely theoretical and shorter, but more hazardous route.

A perfect map of the physical features of California should give all the data that could be demanded by the farmer seeking for land and a home; by the manufacturer, seeking to establish new industries, or to enlarge previous ones; and by the capitalist, seeking for the investment of money in developing its natural resources.

Amongst other information it should afford a complete geographical exhibit of its entire surface. This is absolutely necessary for the agriculturist, the miner, the engineer, the settler, and to the State as a body politic. Without it we can never fairly study the hydraulics of the Sacramento valley; the reclamation of our swamp lands; the irrigation of our millions of rainless acres; the relation of our mineral and timber belts; the most advantageous and profitable lines of transportation; the opening of new avenues of communication and traffic. Every day for years I have been appealed to for information upon these and cognate subjects—information that is scattered in hundreds of dribbets, frequently without recognized authority unless gathered by the State or General Government. The demands are unceasing; the growing need for sound and certain knowledge is increasing fourfold with every dollar to be invested; every year's delay complicates property relations, and involves dead loss from erroneous work.

With such a survey the problem of reclamation and irrigation can be shaped for solution; system can be evolved from the present chaotic condition, and future interminable complications lessened or avoided. It will open fresh fields for the farmer, and give a guarantee for his metes and bounds; it will settle many difficulties arising from imperfect surveys, or from surveys made where local causes are obnoxious yet unknown; it will afford the means of best studying the effects produced in our rivers and the adjacent lands from the deposit of the detritus from hydraulic mining.

The geographical map is the ground and basis of every other character of work involved in a physical survey. The engineer studies it for the location of railroads, highways, canals. Had such a map been in existence the requisite field work of the Water Commissioners would have been a minimum, and the logical conclusions decisive and final. The State studies it to control the projection of railroads by corporations, and may definitively measure the value of any proposed scheme. It can decide almost with certainty what enterprise shall be supported and what condemned. It can winnow the true from the false with merciless precision. It will assist in quieting titles and give stability to landed property. Abroad and in the Atlantic States it would be studied by the thrifty and ambitious householder and mechanic; and by the manufacturer with means to invest, whereby its development would be hastened. It is in vain that you look for details in any published map of this State. Distances are erroneous, orographical features exaggerated or ignored, and locations established very much as in John Phoenix's classical survey of the Mission Dolores. The whole system and method of the usual land surveys of the Government is a delusion and a snare, and any and every map based upon them adds to the confusion. It is but a little over four years since the eastern boundary of this State was discovered to differ three-quarters of a mile from the official location, and nearly two miles in the opposite direction from another survey. About the same time the northern boundary of the State upon the seaboard was discovered to be over half a mile erroneous in its latitude; each settler claimed to be in Oregon when the California tax collector made his appearance, and when the Oregon tax collector grew certain of his game the same settler claimed to be within the State of California. Within a very few miles of San Francisco the

sea coast, by one survey, is suddenly thrust one mile further into the Pacific ocean than by the adjacent survey. On the northern seaboard the coast line is laid down upon a recent map only 17 miles in error, and Cape Lookout is unceremoniously projected four miles further into the Pacific than we have found it. In some recent examinations I found the given position of a well-known landmark and mountain eight or ten miles in error, and a group of snow peaks much further from the truth. With such work before us when shall we ever know the bounds of any piece of property—even its position on the face of the earth is mythical.

This survey would exhibit the character of the soil, its relation to water courses, highways, railroads, its height above the ocean, its relation to the rainfall, to the winds and its location among the isothermals. These would enable all—the old settler and the incoming farmer, to choose their locations without the time, expense and annoyance of traversing the State, at the risk of receiving untrustworthy information from those interested and prejudiced.

It would graphically exhibit the rainfall throughout the State, the force and direction of the winds, the temperature, the hygrometric



Pile Treated by Culver's Process.

condition, the distribution of the flora and principally the extent and character of forest woods and chapparal, the latter for one of the reasons for knowing where the timbered lands lie, its preventing the rapid and destructive effects of the rainfall when quickly reaching the water courses, small and large.

It would exhibit the geology of the State and guide the prospector, the miner, the engineer and the capitalist. It would furnish the material for the intelligent discussion of the economic geology of the country and make it available for every intelligent reader. Much has been already accomplished in this direction and it needs but the collating and publication to be available. The interest manifested in the East in the work alone, prompted the National Academy of Sciences, at its last annual meeting, to urge, by resolution, one of its members to use every honorable effort to have the work which has been done published as early as practicable. Yet we sit with folded arms and move not. At present the two great industries of the State are agriculture and mining. Manufacture and commerce necessarily have an intimate relation and high ratio therewith. This physical survey would among other information afford us tangible, practical and reliable knowledge, applicable to the varied industries which are intimately dependent upon the geology of the State. It would have great influence upon the opening of the deposits of coal, iron, quicksilver, tin and the metalliferous ores generally, guiding the mining engineer in his search and controlling the investor and manufacturer in their relation to means and ways of transportation, and in their relation to

fuel, to water, to supplies and to population. The hundred conditions and contingencies which mar projects, if insufficiently known, would be herein fairly presented for sober discussion and logical deduction. Capital and labor and life that might be wasted in undigested schemes could be surely and securely invested in safe projects to the benefit and prosperity of the State.

The hydraulic mining of this State is yet in its infancy, and there is, doubtless, sufficient gravel deposits already known that will afford large annual yields for the next century; but there is very much yet to be learned and predicted concerning them and their economical working. This survey would exhibit the orographical features and accidents, the sources and extent of the supply of water, the safest and cheapest route for getting it to the work, and enable the engineer to predict the prospective effects of the vast quantities of detritus carried to the lower lands.

I know of no industry which it would not aid and encourage. The fisheries upon the coast and throughout our waters; the commerce along the immediate seaboard; the deep sea traffic carrying our agricultural, mineral and manufactured products to the ends of the earth.

Its beneficial influences would be exerted in a hundred channels not yet appreciated. As a mere question of business it would be the *ne plus ultra* of advertising in the East, and throughout the world, the physical advantages of our State.

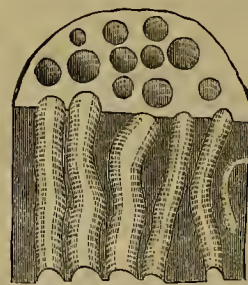
In one sense such a survey would have to be undertaken *de novo*; but already much authen-



The Lightning Can Opener.

tic information is in existence although only partially published, and all disconnected. Every iota of knowledge that has been honestly garnered can have assigned a place and weight in the structure.

As I have already said, the geology of the State has been well advanced, and a large mass of unpublished material is in existence; this can all be utilized. The U. S. Coast Survey has almost completed the topographical survey along the line of coast, giving the orographical features thereof; the hydrography of the coast has been well advanced and is available. The triangulation has been nearly completed from Mexico to Oregon and has commenced spreading its net-work over the whole State. This gives to the State thousands of geographical positions and elevations; the length and true bearings of lines whereby the surveyor can determine quickly and unmistakably the variation of the compass at numerous localities throughout the State. They enable contrasts depending upon distances, etc., to be fairly drawn. In a



Section of Pile Eaten by Ship Worms.

short period the Coast Survey will measure in Yolo county the longest base line ever adopted in any triangulation, and upon it will be built up all the work of the State. All this work the State of California can obtain for the simple asking and copying. And, moreover, by adopting it she preserves the unity of the standard measures of the State and general Government; and homogeneity in the system of work, and in the expression of physical phenomena. Other States are moving in these matters, although possibly not to the completeness which I suggest under the term of a physical survey of California. In 16 States the Governors have applied to the United States Coast Survey for the geographical data necessary for the ground work of surveying the States, and in most of them examinations and measurements are being made. Errors of distances between large towns and cities have been rectified; discrepancies of the old surveys have been adjusted, and the newer and more accurate methods adopted.

The relation which we bear to the Atlantic States; the peculiar character of our climatology; the wonderful favorableness of the wealth of our soil; the winters for carrying on all employments; the wealth from fisheries; the productiveness of our precious metals; the unique geographical position which we hold upon the west coast, whereby we must inevitably control the trade of the Pacific ocean; these, and the considerations already enumerated, and a thousand others that will spring into life, demand that this State should promptly and seriously undertake and carry to completion, a thorough and exhaustive physical survey of the State of California.

Protection of Timber in Salt Water.

In the last number of the PRESS, we gave illustrations of the *Limnoria terebrans*, a little timber-boring shrimp or grebble, which is very destructive to the wharves in this harbor. Mr. Jno. P. Culver, civil and hydraulic engineer, 542 Market street, has issued a pamphlet, in which he describes these little animals and also *Teredo navalis*, or ship worm, which is very destructive here. Mr. Culver has patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a method of protecting piles, timber, etc., from the ravages committed by these creatures, and, in the pamphlet referred to, figures and describes them. We give space to an engraving, showing the appearance of a section of a pile (sawed in two) eaten by ship worms, and also one showing the method adopted by Mr. Culver to protect the pile.

The teredo bores lengthwise, the grain of wood following the rings of annual growth. As long as any wood remains to be eaten between the stages of water where they work, which is usually between low tide and the mud line, they continue completely riddling this wood. In the harbor of San Francisco they are very destructive, as well as along the coast.

The *Limnoria terebrans* eats lengthwise and crosswise the wood both. The teredo and limnoria together make a combination which heretofore has been omnipotent, so that when they once started in on a pile, there was no chance for it. The process invented by Mr. Culver, to prevent these ravages, consists in treating the piles, with the bark on or off, as follows: First there is a poisonous composition brushed over the surface of the pile or timber, which is allowed to dry; then the pile or timber is coated with asphaltum, laid on at great heat to the bare wood, after which burlaps, treated in asphaltum, are wound around in spiral courses while warm and finished by a final coating of hot asphalt. The piles can be handled, transported and driven without injury to the coating.

This pile is first covered with the poisonous composition over the surface, which is shown as darkly shaded in the engraving. The pile is then wound with spiral courses of treated bagging over the same part and then given a final coat of asphalt finishing and is ready to drive.

The cloth or fibrous material being thoroughly saturated with hot asphalt, and protected, will not decay, and forms at the same time a cheap non-corrosive, indestructible, elastic covering, closely adherent and bonded to this wood or bark on the outside of the pile, and held there by the spiral wound fibrous bagging.

Two destructive elements have to be considered in protecting piles in salt water: First, the teredo and boring shrimp below the tide lines; second the natural decay of the wood above the tide lines. By protecting the piles below tide lines with the patent covering, or shell the work of the worm and shrimp is effectually stayed. The cost of preparing a pile in this way is \$3.50, and other timber work in proportion. There are some piles in Battery street wharf treated by this process, which have been down nearly a year, and we are informed that they have not been attacked yet by either the limnoria or teredo. Piles treated this way have been in New York harbor for three years, and the teredo has not attacked them.

An Improved Can Opener.

We illustrate herewith the "Lightning can opener," a device recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by J. P. Louesdale. As will be seen by the engraving, this little implement is both simple in construction and operation, and consists of a sharp steel knife, of the shape shown, which is firmly attached to the handle. To open cans which are usually filled up full and compact, such as many cans of vegetables, the opener is placed on its point on the end of the can, and with both hands on the two ends of the handle, the operator presses steadily downwards, until the handle or cross-bar brings up on the end of the can. This will cut out the circular hole the size of the cutter, all except the space at the heel of the same, leaving a neck to the chip, which answers as a hinge in turning the chip back and forth for a temporary covering. Or if desired, it may be cut out entirely, by revolving the opener slightly and severing the neck with the edges at the heel or by raising the opener slightly and cutting with the edge between the heel and point.

The can can also be opened by holding it in the left hand and the opener in the right (after pressing the opener down with both hands) by revolving the opener to the right and left, as desired, and thus cutting out the entire opening or only a portion of it, as preferred. With large sized cans it is not necessary to hold the can with either hand, as the weight of the can will be sufficient, together with the slight pressure on the opener, to keep it from moving, in which case both hands will be free to turn the opener, as in boring with an auger. This device is a very decided improvement in can openers, being simple of operation and showing no liability to slip and cut the hands. Parties wishing to examine it can see the opener at K. Kenney's, 22 Kearney street, or address G. W. Traver, Oakland. It is desired to sell the right to manufacture and sell for the Pacific coast.

The Pig Iron Market of San Francisco.

The following circular has been issued by Messrs. Jeffrey & Harrison:
TO THE IRON IMPORTERS AND FOUNDRYMEN OF SAN FRANCISCO—GENTLEMEN:

We herewith submit to you as a reference, our annual review of the pig iron market of San Francisco, for the year ending December 31st, 1877.

The monthly quotations, as given below, show that the pig iron market has ruled very uniformly during the year, caused by the heavy stock carried at the commencement of the year, and the importations from the Eastern States and from England. Prices have ruled low because of a marked falling off in the consumption in 1877, as compared with 1876—the use being made of fewer contacts for heavy mining machinery and for house fronts.

In estimating a amount of stock on hand we have included all the pig iron in the interior of California, and the State of Nevada.

But few sales of Scotch Iron were made "to arrive" during the year. Considerable American Iron was placed "to arrive" at from \$28.25 to \$29.50, according to brands.

The following will give the monthly quotations for the year 1877:

SCOTCH, SOFT.	
January.....	\$31.00
February.....	31.00
March.....	30.00
April.....	30.00
May.....	30.00
June.....	30.00

ENGLISH AND AMERICAN, WHITE.	
January.....	\$28.00
February.....	28.00
March.....	28.00
April.....	28.00
May.....	28.00
June.....	28.00

SCOTCH, SOFT.	
January.....	\$29.00
February.....	29.00
March.....	29.00
April.....	29.00
May.....	29.00
June.....	29.00

We find the stock of pig iron on hand Jan 1st, 1877, 1878, 1879, 1880, as compared with the stock on hand Jan 1st, 1877.

Stock of Pig Iron on hand Jan 1st, 1877	
Imports 1877—Scotch, soft.....	15,460
" " American, soft.....	8,710
" " American, white.....	5,375
" " English, white.....	2,755
Total.....	32,300

DETAILED ACCOUNT OF STOCK ON HAND JANUARY 1, 1878.	
In Importers' hands, Scotch, soft.....	7,347
" " American, soft.....	2,626
" " White.....	1,172
In Foundrymen's hands, Scotch, soft.....	1,350
" " American, soft.....	2,246
" " White.....	2,425
Total.....	17,365

Consumption of 1877—White.	
" " American, soft.....	2,073
" " Scotch, soft.....	6,151
" " Scotch, soft.....	7,339
Total.....	15,563

On the way and loading as per latest dates received	
From Scotland and England.....	1,000
From United States.....	2,400
Total.....	3,400

Stock on hand.	
Total.....	17,365
Total.....	20,765

The above figures show a decreased consumption this year as compared with last of 3766 tons, viz: 3003 tons of Soft and 747 tons of White. The importations of 1877 show a decrease of 5733 tons as against the importations of 1876.

NOBLE ILLUSTRATION.—Lord Canarvon, in addressing the people of Birmingham, used the following illustration: "Travelers tell us that in some of the Eastern seas, where those wonderful coral islands exist, the insects that form the coral within the reefs, where they are under the shelter of protecting rocks, out of the reach of wind and wave, work quicker, and their work is apparently sound and good. But on the other hand, those little workers who work outside those reefs, in the foam and dash of waves, are fortified and hardened, and their work is firmer and more enduring. And so I believe it is with men. The more their minds are braced up by conflict, by the necessity of forming opinions upon difficult subjects, the better they will be qualified to go through the hard wear and tear of the world, the better they will be able to hold their own in that conflict of opinion which after all it is man's duty to meet."

WOODWARD'S GARDENS has the following new attractions: The buffalo, the large scale collection; new museum; improvements in the zoological department, besides the other features which have made it popular.

OUR AGENTS.

OUR FRONTS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. L. THARP—San Francisco.
B. W. CROWLEY—California.
A. C. KNOX—Pacific Coast.
C. N. WEST—Santa Cruz, Monterey and San Benito counties.

A. C. CHAMPION—Tulare, Fresno and Inyo counties.
EDWARD S. BAKER—Australian Colonies and Sandwich Islands.

W. D. WHITE—San Bernardino and Los Angeles counties.

J. W. A. WRIGHT—Sacramento, Placer and San Joaquin counties.

B. E. LLOYD—Alameda, Contra Costa and Napa counties.

E. M. DENNY, Oregon.
F. B. ALDERSON, Nevada.

H. E. HALL—San Joaquin, Yolo, Yuba, Sutter and Colusa counties.

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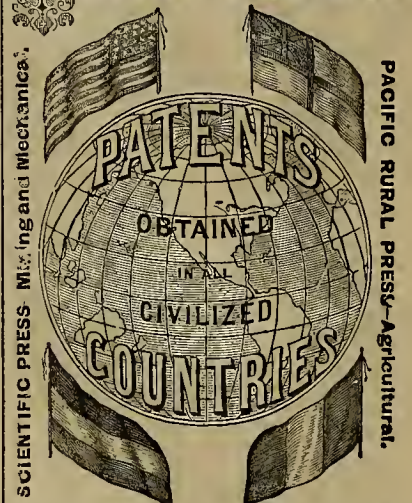
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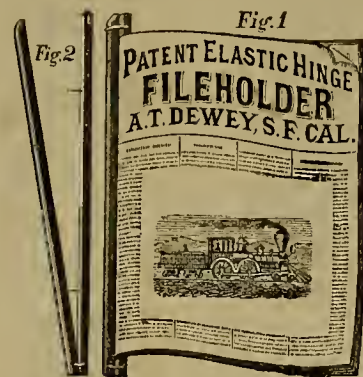
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Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Dec. 26.	Week Ending Dec. 27.	Week Ending Jan. 3.	Week Ending Jan. 10.
Alpha.	142 1/2	133 1/2	131 1/2	12 1/2
Alta.	232 1/2	222 1/2	224 1/2	228 1/2
Andes.	120 1/2	11 1/2	11 1/2	10 1/2
Baltimore Con.	1 1/2	5 1/2	5 1/2	5 1/2
Best & Belcher.	75c	60c	60c	90c
Bullion.	71 1/2	61 1/2	61 1/2	61 1/2
California.	29 23/64	28 23/64	27 23/64	27 23/64
Challenger.	11 1/2	11 1/2	11 1/2	11 1/2
Chollar-Potosi.	43 49/64	40 39/64	39 39/64	34 3/4
Confidence.	67 1/2	51 1/2	51 1/2	51 1/2
Con Imperial.	120 1/2	105 1/2	105 1/2	100 1/2
Con Virginia.	231 201/64	231 201/64	231 201/64	224 1/2
Crown Point.	81 7/8	71 7/8	71 7/8	71 7/8
Coso Con.	35c	35c	35c	35c
Eureka Con.	39 39/64	34 39/64	34 39/64	33 3/4
Excelsior.	54 45/64	41 45/64	45 45/64	41 3/64
Geddes & Bertrand.	40c	35c	40c	40c
Gen Thomas.	40c	35c	40c	40c
Granville.	12 1/2	12 1/2	12 1/2	12 1/2
Globe Con.	11 1/2	11 1/2	11 1/2	11 1/2
Golden Chariot.	160 1/2	11 1/2	135 1/2	11 1/2
Hale & Norcross.	91 1/2	91 1/2	91 1/2	91 1/2
Hussey.	25c	20c	20c	25c
Julia.	290 230/64	255 2/64	240 190/64	2 1/2
Justice.	14 1/2	11 1/2	10 1/2	9 1/2
Kentuck.	52 5/8	51 5/8	51 5/8	51 5/8
Knickerbocker.	30c	25c	25c	20c
Kosuth.	30c	25c	25c	20c
Lady Bryan.	11 1/2	11 1/2	11 1/2	11 1/2
Lady Wash.	11 1/2	11 1/2	11 1/2	11 1/2
Leopard.	11 1/2	11 1/2	11 1/2	11 1/2
Leviathan.	55c	45c	45c	40c
Mexican.	28 2/8	28 2/8	28 2/8	28 2/8
Modoc.	35c	30c	30c	35c
Manhattan.	11 1/2	11 1/2	11 1/2	11 1/2
Mansfield.	40c	30c	30c	25c
Meadow Valley.	40c	30c	30c	25c
Mexican.	14 1/2	14 1/2	14 1/2	14 1/2
North Con Virginia.	1 85c	90c	90c	75c
New York.	2 2/8	2 1/8	2 1/8	2 1/8
Niagara.	12 1/2	11 1/2	11 1/2	11 1/2
Northern Belle.	12 1/2	11 1/2	11 1/2	11 1/2
New Coso.	90c	90c	90c	90c
Occidental.	160 1/2	2 1/2	11 1/2	10 1/2
Ophir.	56 49/64	56 49/64	55 49/64	55 49/64
Overman.	26 24/64	22 24/64	22 24/64	22 24/64
Pacific.	50c	50c	50c	50c
Phil Sheridan.	50c	50c	50c	50c
Panther.	50c	50c	50c	50c
Poorman.	50c	50c	50c	50c
Prospect.	50c	50c	50c	50c
Raymond & Ely.	81 8/8	71 8/8	71 8/8	71 8/8
Rock Island.	25c	20c	20c	20c
Savage.	142 124 1/4	141 122 1/4	141 122 1/4	141 104 1/4
Seg Belcher.	39 39/64	39 39/64	39 39/64	39 39/64
Sierra Nevada.	33 33/64	33 33/64	33 33/64	33 33/64
Silver Hill.	33 33/64	33 33/64	33 33/64	33 33/64
South Chariot.	33 33/64	33 33/64	33 33/64	33 33/64
Succor.	33 33/64	33 33/64	33 33/64	33 33/64
Trojan.	110 90c	95c	60c	65c
Union Con.	110 90c	95c	60c	65c
Utah.	17 1/2	16 1/2	14 1/2	15 1/2
Wells-Fargo.	40c	35c	30c	15c
Woodville.	270 115 1/2	55 1/2	55 1/2	15 1/2
Yellow Jacket.	12 1/2	11 1/2	10 1/2	9 1/2

Sales at S. F. Stock Exchange.

Friday A. M. Jan. 4.	60 Union Con.	61 1/2
1430 Alta.	115 1/2	104 1/2
800 Andes.	14 1/2	12 1/2
950 Best & Belcher.	20 1/2	360
355 Belcher.	34 1/2	145 1/2
135 Bullion.	350	147 1/2
495 Benton.	380	300
400 Boyle.	90c	160
55 Chollar.	30c	202 1/2
500 California.	24 1/2	460
1005 Con Imperial.	24 1/2	720
800 Crown Point.	76 1/2	5
1550 Con Virginia.	105 1/2	1015
320 Caledonia.	40 1/2	200
235 Caledonia.	110 1/2	350
670 Dayton.	600	555
300 Excelsior.	440 24/64	45
140 Gould & Curry.	91 50	100
900 Hale & Norcross.	91 20	200
910 Justice.	112 1/2	60
1300 Julia.	112 1/2	60
1400 Joe Seates.	110c	300
630 Kentuck.	54 5/6	400
55 Kosuth.	20c	20c
130 Lady Wash.	150	150
500 Leviathan.	40c	35
150 Lee.	120 1/2	40
1045 Mexican.	15 1/2	150
370 North Con Vir.	150	150
1355 New York.	165 1/2	90
375 Ophir.	54 5/6	200
230 Overman.	22 1/2	22 1/2
50 Occidental.	110	110
1355 Overman.	110	110
40 Sierra Nevada.	55 1/2	1200
410 Silver Hill.	31 1/2	40
320 Solid Silver.	54 5/6	120
350 Succor.	150 1/2	150
550 Union Con.	61 1/2	60
170 Union Con.	61 1/2	60
60 Utah.	15 1/2	150
105 Woodville.	10 1/2	105
320 Yellow Jacket.	10 1/2	10
AFTERNOON SESSION.		
1205 Alta.	22 1/2	22 1/2
610 Alps.	7 1/2	7 1/2
250 Argenta.	13 1/2	13 1/2
50 Alps.	13 1/2	13 1/2
65 Bodie.	13 1/2	13 1/2
150 Bullion.	61	61
200 Belmont.	25c	25c
10 Belcher.	150	150
25 Best & Belcher.	19 1/2	19 1/2
200 Benton.	30	30
2350 Belle Isle.	150	150
300 Con Virginia.	24 1/2	24 1/2
202 California.	23 1/2	23 1/2
375 Crown Point.	61 1/2	61 1/2
170 Caledonia.	44 1/2	44 1/2
350 Con Imperial.	90 1/2	90 1/2
350 Combination.	20c	20c
415 Day.	21 1/2	21 1/2
75 DeFrees.	55c	55c
300 Endowment.	90c	90c
350 Eureka Con.	37 3/4	37 3/4
85 Excelsior.	170	170
755 Grand Prize.	14 1/2	14 1/2
100 Golden Chariot.	110	110
100 Gen Thomas.	350	350
200 Hussey.	100	100
60 Independent.	90c	90c
60 Julia.	190 1/2	160 1/2
150 K Con.	91	91
575 Leopard.	16 1/2	16 1/2
955 Leeds.	21 1/2	21 1/2
100 Lady Wash.	14 1/2	14 1/2
100 Manhattan.	11 1/2	11 1/2
140 Mexican.	370	370
100 Meadow Valley.	75c	75c
350 Modoc.	55 1/2	55 1/2
350 New Coso.	90c	90c
845 Northern Belle.	110	110
350 Navajo.	65 1/2	65 1/2
70 Ophir.	53	53
200 Overman.	22 1/2	22 1/2
70 Ry Patch.	102 1/2	102 1/2
830 Star.	80 1/2	80 1/2
75 Silver Prize.	400 1/2	400 1/2
200 Utah.	16 1/2	16 1/2
60 Utah.	16 1/2	16 1/2

450 Lee.	105 1/2	105 1/2
250 Leviathan.	35c	35c
60 Lady Wash.	11 1/2	11 1/2
440 Mexican.	15 1/2	15 1/2
160 Morning Star.	80c	80c
600 Monumental.	15c	15c
600 New York.	170 1/2	170 1/2
700 North Con Vir.	75c	75c
30 Occidental.	90c	90c
565 Ophir.	54 5/6	54 5/6
545 Overman.	20 1/2	20 1/2
200 Rock Island.	20c	20c
120 Sierra Nevada.	4 90	4 90
300 Savage.	11 1/2	11 1/2
330 Silver Hill.	31 1/2	31 1/2
100 Solid Silver.	54 5/6	54 5/6
200 Senator.	33 1/2	33 1/2
125 Utah.	14 1/2	14 1/2
640 Union Con.	61 1/2	61 1/2
5 Woodville.	11 1/2	11 1/2
900 Wells-Fargo.	10c	10c
260 Yellow Jacket.	10 1/2	10 1/2
AFTERNOON SESSION.		
750 Argenta.	170 1/2	170 1/2
100 Alps.	7 1/2	7 1/2
300 Argenta.	13 1/2	13 1/2
20 Alps.	12 1/2	12 1/2
500 Belle Isle.	15c	15c
150 Bodie.	13 1/2	13 1/2
120 Bodie & Belcher.	19 1/2	19 1/2
240 Belcher.	41 1/2	41 1/2
945 Benton.	41 1/2	41 1/2
635 Con Virginia.	24 1/2	24 1/2
430 Crown Point.	61 1/2	61 1/2
300 Caledonia.	35 1/2	35 1/2
375 California.	25 1/2	25 1/2
400 Combination.	25 1/2	25 1/2
1200 Day.	22 1/2	22 1/2
200 DeFrees.	75 1/2	75 1/2
100 Eureka Con.	37 3/4	37 3/4
300 Excelsior.	170	170
1300 Endowment.	90c	90c
755 Grand Prize.	14 1/2	14 1/2
150 Gila.	11 1/2	11 1/2
320 Gould & Curry.	91 20	91 20
50 General Thomas.	35c	35c
440 Hale & Norcross.	91 20	91 20
700 Hussey.	100	100
200 Independent.	90c	90c
510 Justice.	9 1/2	9 1/2
2380 Kentuck.	54 5/6	54 5/6
75 K Con.	91 20	91 20
1455 Leeds.	21 1/2	21 1/2
220 Lequinta.	10 1/2	10 1/2
40 Modoc.	55 1/2	55 1/2
50 Manhattan.	11 1/2	11 1/2
575 Mexican.	15 1/2	15 1/2
430 Meadow Valley.	75c	75c
100 Martin White.	30c	30c
100 Navajo.	65 1/2	65 1/2
40 Northern Belle.	110	110
400 New York.	215 1/2	215 1/2
100 New Coso.	90c	90c
555 Ophir.	54 5/6	54 5/6
230 Overman.	21 1/2	21 1/2
10 Raymond & Ely.	5	5
390 Savage.	11 1/2	11 1/2
2350 Star.	80 1/2	80 1/2
400 Silver Prize.	400 1/2	400 1/2
500 Star.	95c	95c
780 Tipton.	110 1/2	110 1/2
230 Venture.	40c	40c
50 Young America.	40c	40c
270 Yellow Jacket.	10 1/2	10 1/2
Tuesday A. M. Jan. 8.		
10 Alps.	13 1/2	13 1/2
6025 Alta.	23 1/2	23 1/2
165 Andes.	14 1/2	14 1/2
925 Bullion.	66 1/2	66 1/2
310 Belcher.	51 1/2	51 1/2
345 Best & Belcher.	20 1/2	20 1/2
750 Benton.	40 1/2	40 1/2
2350 Boyle.	10 1/2	10 1/2
2405 Con Imperial.	95c	95c
490 Crown Point.	61 1/2	61 1/2
410 Chollar.	36 1/2	36 1/2
120 Con Virginia.	24 1/2	24 1/2
355 California.	24 1/2	24 1/2
880 Caledonia.	39 1/2	39 1/2
250 Capital.	11 1/2	11 1/2
450 Dayton.	50 1/2	50 1/2
1340 Excelsior.	170	170
265 Gould & Curry.	91 20	91 20
360 Hale & Norcross.	91 20	91 20
325 Justice.	12 1/2	12 1/2
200 Joe Seates.	110	110
85 California.	25 1/2	25 1/2
300 Kosuth.	20c	20c
100 Lee.	105	105
325 Leviathan.	40c	40c
200 Lady Wash.	14 1/2	14 1/2
715 Mexican.	15 1/2	15 1/2
1200 Monumental.	15c	15c
100 North Con Vir.	75c	75c
1025 New York.	240 1/2	240 1/2
240 Old Coso.	90c	90c
350 Ophir.	54 5/6	54 5/6
300 Occidental.	120 1/2	120 1/2
100 Rock Island.	20c	20c
535 Sierra Nevada.	54 1/2	54 1/2
300 Solid Silver.	54 5/6	54 5/6
330 St Louis.	40c	40c
3050 South Comstock.	80 1/2	80 1/2
1300 Trojan.	65 1/2	65 1/2
180 Union Con.	61 1/2	61 1/2
1200 Utah.	16 1/2	16 1/2
100 Woodville.	10 1/2	10 1/2
1650 Wells-Fargo.	10c	10c
620 Yellow Jacket.	11 1/2	11 1/2
AFTERNOON SESSION.		
100 Alps.	13 1/2	13 1/2
200 Argenta.	13 1/2	13 1/2
2070 Argenta.	13 1/2	13 1/2
400 Bodie.	13 1/2	13 1/2
100 Bodie & Belcher.	19 1/2	19 1/2
400 Boyle.	90c	90c
1925 Con Imperial.	95c	95c
490 Crown Point.	61 1/2	61 1/2
285 Con Virginia.	24 1/2	24 1/2
720 California.	23 1/2	23 1/2
330 Caledonia.	39 1/2	39 1/2
30 Confidence.	52 1/2	52 1/2
90 Challenge.	120	120
275 Chollar.	39 1/2	39 1/2
300 Chollar.	39 1/2	39 1/2
300 Chollar.	39 1/2	39 1/2
350 Excelsior.	170	170
580 Gould & Curry.	91 20	91 20
115 Hale & Norcross.	91 20	91 20
100 Hussey.	100	100
860 Julia.	26 1/2	26 1/2
100 Joe Seates.	110	110
125 Kentuck.	54 5/6	54 5/6
100 Kosuth.	20c	20c
100 Lady Wash.	14 1/2	14 1/2
350 Lee.	105	105
175 Leviathan.	40c	40c
180 Mexican.	15 1/2	15 1/2
840 New York.	205 1/2	205 1/2
70 North Con Vir.	75c	75c
210 Overman.	21 1/2	21 1/2
100 Ophir.	54 5/6	54 5/6
100 Occidental.	120 1/2	120 1/2
515 Savage.	11 1/2	11 1/2
1250 Sierra Nevada.	54 1/2	54 1/2
1250 Silver Hill.	31 1/2	31 1/2
500 Senator.	33 1/2	33 1/2
300 Trojan.	65 1/2	65 1/2
195 Union Con.	61 1/2	61 1/2
200 Wells-Fargo.	10c	10c

SALES OF LAST WEEK AND THIS COMPARED.

Thursday A. M. Jan. 8.	Thursday A. M. Jan. 10.
100 Alps.	13 1/2
1005 Alta.	23 1/2
150 Bodie.	13 1/2

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

By Special Dispatch from Washington, D. C.

WEEK ENDING DECEMBER 25TH.

EXCAVATOR.—J. A. Ball, Oakland, Cal.
COMBINED OVERFLOW AND GAS TRAP FOR STATIONARY WASH BASIN.—A. K. Grim and J. B. Low, S. F.
STRETCH TRAP.—A. K. Grim and J. B. Low, S. F.
SNOW-FLOW.—G. Royal, Truckee, Cal.
CLAMP FOR ROCK DRILLS.—P. S. Buckminster, Belleville, Nev.
STRETCH TRAP.—F. W. Volkmann, S. F.
UNDERMINE.—Clair S. Bradley, S. F.
PORTABLE HOISTING APPARATUS OR WAGON DERRICK.—W. W. Carille, Ione City, Cal.
HARROW.—Frank A. Hill, San Leandro, Cal.
HARVESTER AND THRESHING.—W. B. Rico, Modesto, and J. C. Hault, Stockton, Cal.
WOOL WASHING MACHINE.—J. Bachelder, Napa, Cal.
CHUCK FOR ROCK DRILLING MACHINES.—P. S. Buckminster, Belleville, Nev.
SPRING-COCK ATTACHMENT.—S. W. Denniston and C. Simmonds, Prescott, A. T.
SWINGS.—C. Hartman and F. A. Freese, S. F.
BED BOTTOM.—T. J. Pettit, S. F.
MACHINE SHUTTLE.—C. H. Schumacher, Walla Walla, W. T.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

REMOVING AND DESTROYING SEWER GASES.—S. J. Corbett, Los Angeles. This is a novel method for destroying such noxious gases as are generated in the sewers of a city. It consists in leading a pipe from the sewer to each of the gaslights along its line, so that the gases will be conducted to and delivered into the flames and be destroyed. Numerous plans have been devised to prevent the escape of these foul gases through the conduits which lead from sewers into houses and into the streets of a city, without adequate means being provided for allowing them to make their escape from the sewer. This compels the gas to accumulate in the sewers, so that they soon become charged with it, and the difficulty of preventing it from escaping into the houses and streets is increased. Mr. Corbett's plan is intended not only to provide a vent through which these gases can pass to the open air in the day time as fast as they accumulate, but when the gas is lighted at night, each gas jet establishes a draft through the sewer gas vent pipe, which draws the gases into the flame, where it is destroyed, thus preventing any accumulation of gas in a sewer.

WELL BORING APPARATUS.—Joseph Benner-schidt, Anaheim. This invention relates to an improved device for sinking or boring wells, and for removing the earth and borings therefrom. It consists in the employment of a hydraulic stream of water forcibly ejected through a pipe and nozzle against the earth in the bottom of the well by a pump. As fast as sinking proceeds the curh or lining is forced down into the excavation, so that the stream of water has only a diameter equal to the diameter of the tube or curh to act directly upon. The water forced in rises in the pipe and overflows its top, carrying off the detached soil loosened by the force of the water. A flexible hose with an iron pipe on the end is used to carry the water to the bottom as it is forced down by the pump.

BED LOUNGE.—Frederick Jensen, Seattle, W. T. This invention relates to an improvement in bed lounges, and consists in the peculiar construction of springs employed, together with adjustable head rests, and the legs in combination with a hand or strap. The arrangements of springs is especially adapted for use in bed lounges.

FIRE BRICK.—W. P. Prescott and Geo. R. Evans, Carson City, Nev. This invention relates to an improved combination of materials for forming fire bricks, which will withstand any ordinary temperature to which they may be subjected. Asbestos enters largely into the structure of the new fire brick.

News has been received at Eureka that T. J. Andrews, formerly foreman of the Raymond & Ely, and a well-known mining man, has just made a good strike near Cherry creek. He has a three-foot ledge, which assays well. There is not a pound of waste rock in the vein. There is great excitement in Cherry creek and vicinity over the discovery.

We commend to the attention of the members of the Legislature Prof. Davidson's able article on the necessity of a physical survey of the State of California, which we publish in this issue of the PRESS.

Mining Share Market.

The feature of the week in mining stock circles has been the "deal" in Alta. Over 40,000 shares changed hands in both Boards on Wednesday. Attention is just now turned more particularly to the Alta and Justice mines, from the statements of a bonanza between the two and the antagonistic interests. The rulers of the Justice persist in pushing the suits against the Alta, for the alleged wrongful conveyance of the property and rights of the Justice stockholders to the Alta company, and demand a reconveyance of the alleged fraudulently conveyed property. It is even intimated that criminal will supplement the civil proceedings. The Justice people bring suit to set aside the alleged fraudulent deed to the Alta, and measures were taken to have the Cook brothers brought into Court and required to explain on oath the precise circumstances and considerations attending the conveyance of the Justice ground and the execution of the mysterious deed signed by the ousted President of the Justice. The Alta people do not seem to be in any hurry to have the proceedings terminated, and, in fact, it looks as if they were purposely delaying the proceedings. The case has been transferred to the U. S. Circuit Court, as certain points devolve upon construction of Federal law. The search of the important deed, drawn for a consideration of \$1, is a matter of great interest to stockholders just at present more than any previous time, when rumors of a bonanza are so plentiful.

In connection with this matter the Gold Hill News says: There is no doubt at all of the development of a valuable ore deposit in the Alta, and the principal trouble at present is to find out who has the best title to it. Rumors of a compromise between the various contending parties and interests have been in circulation for the last day or two, but there has nothing decisive been done in the matter as yet. President Baldwin, of the Justice, swears that nothing short of a complete surrender of that deed to the Alta will do him. It is to be hoped that the proprietorship of that rich little bonanza will be decided equitably and finally very soon. Meanwhile the flow of hulkion from the bonanza mines continues unabated, and showing no immediate chance for diminution. Connection is completed between the Chollar mine and the Combination shaft on the 1785-ft level, giving not only fine and much needed ventilation at that depth, but also a new and advantageous opportunity for Comstock drainage should it be required.

NATIONAL GOLD BANK AND TRUST COMPANY.—The annual meeting of this favorably-known banking corporation was held on Tuesday. President Burton submitted his report of the business for the past year. The gross earnings had been \$130,000, and the gross expenses \$33,000, making the net earnings \$97,000. Many of the old affairs of the bank had been settled and others were in a fair way of adjustment. With a continuance of present prosperity, the President was of the opinion that dividends at the rate of 9% per annum could be commenced and maintained. The Cashier's report showed the deposits for the year to have been \$33,892,373, and the amount of cash on hand on the 31st of December, was given at \$149,073. The election for Directors resulted in the unanimous choice of the following named gentlemen: I. G. Wickersham, J. O. Eldridge, Samuel Crim, H. L. Davis, Geo. L. Bradley, Wm. Blackwood, C. H. Burton, P. B. Horton, Lloyd Tevis, M. Lynch, Claus Spreckles.

BULLION SHIPMENTS.—Since our last issue shipments of hulkion from the prominent mines have been as follows: Leopard, Jan. 2d, \$8,300; Grand Prize, 2d, \$36,700; Tyler Con., Dec. 26th, \$3,870.03; on the 29th, \$7,745; Endowment, Jan. 2d, \$24,767; Northern Belle, Dec. 31st, \$2,622; Manhattan, Jan. 1st, \$3,088; Alps, 2d, \$1,497; Grand Prize, 5th, \$29,200; Tyler Con., Dec. 30th, \$3,694; Alps, Jan. 3d, \$1,507; Northern Belle, 2d, \$2,726; Arizona, 5th, \$1,386; California, 7th, \$351,300.03; Con. Virginia, 7th, \$524,743.44; Northern Belle, 5th, \$4,492.42; Standard, 6th, \$67,558.90; Grand Prize, 9th, \$30,900; Alps, 8th, \$1,747; Leopard, 7th, \$4,900.

COPPER'S MINING LAWS.—This little manual contains all the United States mining laws, and Land Office instructions, the digest of decisions, together with the forms necessary to be used in procuring title, and is convenient for every mining man. By consulting this book, mine owners and claimants will be able to avoid the payment of consultation fees for legal advice; and by having the laws and decisions before them, they may also avoid expensive litigation in many cases.

For sale by Dewey & Co., 202 Sansome street, S. F. Price, \$1.

PARTIES in Virginia City say, the triangular squabble between the Justice, Alta and Lady Washington companies will end in a consolidation of the three companies named with the Keystone, after which the four claims will be sold to two companies having a capital stock of \$10,000,000 each and 100,000 shares apiece.

TWENTY-FIVE new mines have been located in Eureka mining district since Jan. 1st.

METALS.

(WHOLESALE.)

THURSDAY, M., January 10, 1878.

IRON.—		
American Pig, ton.	28 00	@ 30 00
Scotch Pig, ton.	28 00	@ 30 00
White Pig, ton.	28 00	@ 30 00
Oregon Pig, ton.	—	@ —
Refrined Bar.	21 00	@ 24 00
Horse Shoes, keg.	5 00	@ 5 34
Nail Rod.	—	@ —
Norway, Oval.	—	@ 7 1/2
COPPER.—		
Sheeting, lb.	34 00	@ 35 00
Sheeting, Yellow.	—	@ 24 00
Sheeting, Old Yellow.	12 00	@ 12 1/2
Composition Nails.	24 00	@ 25 00
Composition Bolts.	24 00	@ 25 00
STEEL.—		
English Cast, lb.	13 00	@ 14 00
American & Woods, ordinary sizes.	15 00	@ —
Drill.	15 00	@ —
Flat Bar.	14 00	@ —
Plow Steel.	84 00	@ 12 1/2
TIN PLATES.—		
10x14 I O Charcoal.	7 50	@ 8 50
Malacca Tin.	23 00	@ 24 00
Australian.	17 00	@ 17 1/2
ZINC.—		
By the Cask.	9 00	@ —
Zinc Sheet 7x3 ft, 7 to 10, lb.	9 00	@ 10 00
7x3 ft, 11 to 14.	10 00	@ —
8x4 ft, 8 to 10.	11 00	@ —
8x4 ft, 11 to 10.	11 00	@ —
NAILS.—		
Assorted sizes.	3 15	@ 3 25
QUICKSILVER.—		
By the lb.	45 00	@ —

LEATHER.

(WHOLESALE.)

WEDNESDAY M., January 9, 1878.

Sole Leather, heavy, lb.	28 00	@ 29 00
Light.	22 00	@ 24 00
Joint, 8 Kil, doz.	48 00	@ 50 00
11 to 13 Kil.	65 00	@ 70 00
14 to 19 Kil.	80 00	@ 90 00
Second Choice, 11 to 13 Kil.	55 00	@ 70 00
Corrallian, 12 to 16 Kil.	57 00	@ 67 00
Females, 12 to 13 Kil.	63 00	@ 67 00
14 to 16 Kil.	71 00	@ 75 00
Simon Ulmo, Females, 12 to 13 Kil.	58 00	@ 62 00
14 to 15 Kil.	66 00	@ 70 00
16 to 17 Kil.	72 00	@ 74 00
Simon, 18 Kil.	61 00	@ 63 00
20 Kil.	65 00	@ 67 00
24 Kil.	72 00	@ 74 00
Robert Calf, 7 and 9 Kil.	35 00	@ 40 00
Kips, French, lb.	1 00	@ 1 25
Cal. doz.	40 00	@ 60 00
French Sheep, all colors.	8 00	@ 15 00
Eastern Calf for Backs, lb.	1 00	@ 1 25
Sheep Roams for Topping, all colors, doz.	9 00	@ 13 00
For Linings.	5 50	@ 10 00
Cal. Russet Sheep Linings.	1 75	@ 4 50
Root Legs, French Calf, pair.	4 00	@ —
Good French Calf.	4 00	@ 4 75
Best Jodot Calf.	5 00	@ 5 25
Leather, Harness, lb.	35 00	@ 38 00
Fair Bridle, doz.	48 00	@ 72 00
Siding, lb.	33 00	@ 37 00
Wet, doz.	30 00	@ 50 00
Buff, ft.	18 00	@ 20 00
Wax Side.	17 00	@ 18 00

Gold, Legal Tenders, Exchange, Etc.

(Corrected Weekly by SUTRO & Co.)

SAN FRANCISCO, January 9, 3 P. M.
LEOAL TENDERS IN S. F., 11 A. M., 97 1/2% SILVER, 41 1/2% GOLD IN NEW YORK, 102.
GOLD BARS, \$90 @ 10. SILVER BARS, \$81 1/2 @ cont. discount.
EXCHANGE ON NEW YORK, 1/2% ON LONDON BANKERS, 49 1/2; Commercial, 50; Paris, five francs 1/2 dollar; Mexican dollars, 33.
LONDON CONSOLS, 94 11-16; Bonds, 105 1/2.
QUICKSILVER IN S. F., by the flask, 7 lb, 46 @ 47 1/2.

Signal Service Meteorological Report.

Week Ending January 8, 1878.

HIGHEST AND LOWEST BAROMETER.							
Jan. 2.	Jan. 3.	Jan. 4.	Jan. 5.	Jan. 6.	Jan. 7.	Jan. 8.	
30.20	30.20	30.16	30.08	30.00	30.02	30.22	
30.22	30.16	30.06	29.93	29.93	29.93	30.00	
MINIMUM AND MAXIMUM THERMOMETER.							
40	49	51	52	55	58	61	
50	41	30	42	47	47	54	
MEAN DAILY HUMIDITY.							
61	50	62	60	64	88	87	
PREVAILING WIND.							
E	NE	N	SE	NW	SE	SE	
WIND—MILES TRAVELLED.							
72	91	79	87	85	08	150	
STATE OF WEATHER.							
Clear.	Clear.	Clear.	Fair.	Rainy.	Rainy.	Rainy.	
RAINFALL IN TWENTY-FOUR HOURS.							
				.02	.28	.59	
Total rain during the season, from July 1, 1877, 5.79 in.							

W. T. GARRATT'S

BRASS AND BELL FOUNDRY

SAN FRANCISCO.

MANUFACTURER AND IMPORTER OF

Church and Steamboat BELLS and GONGS,
BRASS CASTINGS of all kinds,
WATER GATES, GAS GATES,
FIRE HYDRANTS,
DOCK HYDRANTS,
GARDEN HYDRANTS.

A General Assortment of Engineers' Findings.

Hooker's Patent Celebrated

STEAM PUMP

The Best and Most Durable in use. Also, a variety of other

PUMPS

For Mining and Farming Purposes.

ROOT'S BLAST BLOWERS,

For Ventilating Mines and for Smelting Works.

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Garratt's Improved Journal Metal.

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IRON PIPE AND MALLEABLE IRON FITTINGS.

ALL KINDS OF

WORK AND COMPOSITION NAILS,
AT LOWEST RATES.

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Mission Street. Between Third and Fourth.

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MISS MINNIE WALTON.

Open every evening with a first class Dramatic Company. Box office open from 9 A. M. to 10 P. M. Doors open at half past seven. Commence at eight.

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John McCulloch, Proprietor and Manager. Barton Hill, Acting Manager.

Bush Street, above Kearny. Open every evening. THE BLACK CROOK and the Kinky Ballet. Box office open from 9 A. M. to 10 P. M. Seats may be secured six days in advance. In Preparation, JOURNEY TO THE MOON.

EMERSON'S OPERA HOUSE.

Bush Street. Between Montgomery and Kearny.

ADAM RICHMOND,

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THOMAS MAGUIRE, Manager.

Corner Market and Powell Streets. Open every evening and Saturday matinee. Union Square theater company. Magnificent scenery; elegant appointments. Box office open daily.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

California Fruit Growing Association.

Principal place of business, San Francisco. Location of property, El Dorado County, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the seventeenth day of December, 1877, an assessment of two (\$2) dollars per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at 331 Sansome Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the twenty-second day of January, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the ninth day of February, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

HORACE JONES, Sec'y

Office, 331 Sansome Street, San Francisco, Cal.

South Overman Consolidated Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Gold Hill, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the twenty-sixth day of December, 1877, an assessment of No. 2, of twenty-five (25) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, 328 Montgomery Street, Room 21, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-eighth day of January, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the eighteenth day of February, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

DAVID WILDER, Sec'y

Office, 328 Montgomery Street, Room 21, San Francisco, Cal.

Mariposa Land and Mining Company of

California. Location of principal place of business, San Francisco, California. Location of works, Mariposa County, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the seventh day of January, 1878, an assessment of No. 13, of one (\$1) per share was levied upon the capital stock of the corporation, payable immediately in U. S. currency to the Secretary, at the office of the company, room 3, Nevada Block, No. 309 Montgomery Street, San Francisco, California, or to the Assistant Secretary, at the office, No. 9, Nassau Street, New York.

Any stock upon which this assessment shall remain unpaid on the eleventh day of February, 1878, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the twelfth day of March, 1878, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

LEANDER LEAVITT, Sec'y

Office, Room 33, Nevada Block, No. 309 Montgomery St., San Francisco, Cal.

Manzanita Gold Mining Company.

Location of principal place of business, San Francisco, Cal. Location of works, Sulphur Creek, Colusa County, Cal.

NOTICE.—There are delinquent upon the following described stock, on account of assessment No. 1, levied on the third day of December, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Spratt, Geo S, trustee.	46	300	\$30 00
Spratt, Geo S, trustee.	47	300	30 00
Spratt, Geo S, trustee.	48	300	30 00
Spratt, Geo S, trustee.	51	200	20 00
Spratt, Geo S, trustee.	52	200	20 00
Spratt, Geo S, trustee.	53	200	20 00
Spratt, Geo S, trustee.	54	400	40 00
Spratt, Geo S, trustee.	124	1345	134 50
Spratt, Geo S, trustee.	128	70	7 00
Spratt, Geo S, trustee.	129	65	6 50
Spratt, Joseph.	68	2900	290 00
Spratt, Joseph.	69	2000	200 00

And in accordance with law, and an order of the Board of Directors, made on the third day of December, 1877, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, on the third day of January, 1878, at the hour of two o'clock, P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

Geo. S. SPRATT, Sec'y

Office, 51 Fremont Street, San Francisco, Cal.

Summit Mining Company.—Location of

Iron and Machine Works.

THOS. PENDERGAST.

HENRY S. SMITH.

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS

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OF ALL KINDS.

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Are prepared to make SHEET IRON AND ASPHALTUM PIPE, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.

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ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

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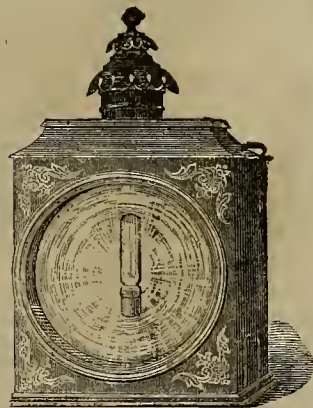
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Patent Mining & Locomotive Head-Light.

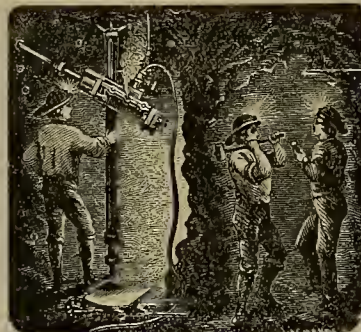
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Mines Using these Drills on the Comstock Lode—Virginia City, Nevada.

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THE O'HARRA CHLORIDIZING FURNACE

Guaranteed to Chloridize from 85 to 95 per cent. of any gold or silver ores that are not more profitable for smelting. Will also desulphurize ores and put them in proper shape for working in cupola furnaces.

Cost of Roasting and Chloridizing 20 Tons in 24 Hours by this Process:

One man.....	\$ 4 00
One man.....	3 00
Wood—2½ Cords at \$3 per cord.....	5 25
Salt—1,600 lbs at 2½ cents.....	40 00
Cost of 20 tons.....	\$52 25
Cost of one ton.....	2 61

In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

The furnace is now working successfully at the Poe Con solidated Co.'s mines, in Peavine District, Nev., and at the Exchequer mill, Alpine Co., Cal. For further information, apply to

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FOR SALE.

Nine by Fifteen Inch Second Hand Varney Rock Breaker. Address "ENGINEER," Box 2361, San Francisco, Cal.

Attention, Mining Companies.

RICKARD'S PATENT

Oxidizing and Chloridizing

FURNACE,

FOR ROASTING

COPPER, SILVER & OTHER ORES

Prior to Leaching or Amalgamation.

The most striking advantages which it offers above all other recent inventions of this nature may be briefly summed up as follows:

First.—Its cheapness, the cost of its erection (ex-royalty and freight) not exceeding \$1,500, for a capacity to roast and chloridize twenty tons per day, viz: brick work, \$1,000, and iron work, including blower, \$500.

Second.—Short time required for erection, viz: 14 days, after providing all materials, with a sufficiency of labor.

Third.—No expensive, heavy or complicated machinery being necessary, involving heavy freight to the district where it may be required. Brick and clay generally obtainable on the spot, being the chief materials required in its construction.

Fourth.—No skilled labor or technical experience is necessary to work it. Two ordinary laborers being sufficient to attend to it when in full operation.

Fifth.—It does not easily get out of order, and is readily repaired by an ordinary mason or blacksmith when it does.

Sixth.—The royalty, or license to use it, is exceedingly moderate, removing thereby all temptation to evade or infringe the patent.

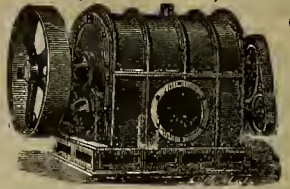
Seventh.—Calculating labor at \$3 per day, and wood at \$6 per cord, the cost of roasting is but little over \$1.50 per ton (ex-salt when chloridized), at these high California rates for labor and fuel.

One of them is now in the course of erection by the Aztec Gold and Silver Mining Company, at their mill in the Aztec District, Santa Rita mountains, Southern Arizona. At their office, 302 Montgomery Street, rooms 14 and 15, a model may be seen, and working drawings, with all further information necessary to enable any ordinary mason to construct the furnace, may be obtained from

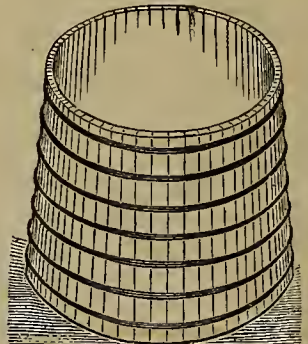
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WATER TANKS of any capacity made entirely machinery. Materials the best in use; construction not excelled. Pan Staves, Tubs and Oak Guides for mining purposes a specialty.

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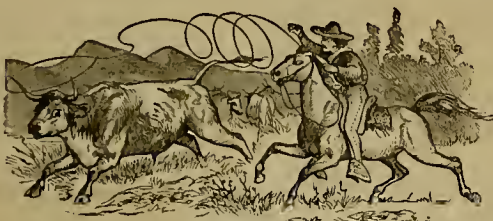
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LEATHER BELTING.

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FILLED
LEATHER
BELTING.



RAWHIDE BELTS,
Rope and Lacing.

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Many who are acquainted with the manner in which this business has heretofore been conducted, (with or without assistance by local attorneys,) will see at once the great advantage of patronizing an establishment that is thoroughly organized and has its representatives in Washington to look after and prosecute their applications before the Commissioner of the General Land Office. The business on this Coast will be attended to by JOHN L. BOONE, Esq., Attorney-at-Law, one of the members of this firm.

Correspondence from persons desirous of securing patents for Lands, Mines, Mill Sites, Canal and Ditch property, promptly attended to.

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COMPANY,

OFFICE OF THE
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CRUSHING ROLLERS AMALGAMATING MACHINERY
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AGENTS FOR
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Hoisting Engines, Diamond Pointed Rock Drills,
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Solid and Homogeneous. An invaluable substitute for expensive forgings, or for Cast Iron requiring great strength. Send for circular and price-list to

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THE MOST POWERFUL AND THE NEAREST PERFECTION
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GALE, WILL KEEP YOUR TANK FILLED WITH

Water Without Waste and Without Attention,

EXAMINE THE RECENT

Improvements of Mr. Bachelder,

As now Manufactured by the

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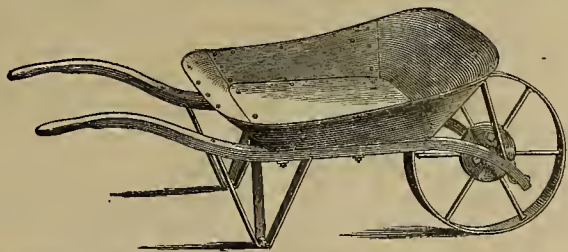
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JANUARY 19, 1878.

VOLUME XXXVI.
Number 3.

The Cariboo Quartz Ledges.

We present herewith a diagram of the Bonanza and Steadman ledges, recently discovered in the Cariboo mining district, British Columbia. By referring to the diagram, the letters indicate the following claims on the Bonanza ledge: 1, British Columbia M. & W. Co.; 2, Ring Co.; 3, C. Sadow, Crown Grant; 4, Australian Co.; 5, Dunlavy Co.; 6, Pinkerton Co.; 7 and 8, Enterprise Co.; C, tunnel of the Enterprise now under way, estimated length 275 feet. This will cut the ledge 150 feet from the surface.

The work of development has commenced in earnest, and indications all point to the opening of a large and productive quartz mining region. The present government of the Province is active in promoting the development of the country, and a few months since engaged Mr. R. B. Harper, an old and experienced quartz miner, to visit the Cariboo region and give the quartz prospects a careful examination. Mr. Harper, after a careful investigation, satisfied himself of the existence of paying quartz, and under his direction tunnels were run which demonstrated beyond a doubt the correctness of his theories. The principal claims are located upon the "Big Bonanza" ledge, situated on the summit of

claim a cut has been run across the vein, showing the same character of ore found in the Cariboo. It is proposed to open the St. Lawrence by a tunnel 350 feet in length, which will cut the vein at a depth of 100 feet from the surface. The American company's claim adjoins the Cariboo on the north. An open cut has been run across the vein, showing the same kind of ore disclosed in the Cariboo and St. Lawrence. A tunnel is projected by this company which will cut the vein 150 feet from the top. The Pinkerton lies next to the American. The ledge in this location has been cut through by Lowhee creek in the Victoria shaft, at a depth of 350 feet from the croppings of the

mining in the district Mr. Harper represents to be extremely favorable. Wood is \$4 per cord and water power is abundant. Labor is plentiful. The winters in Cariboo are severe, but no more than in many elevated localities in California and Colorado where mining is carried on all the year through. The location of the Big Bonanza ledge is such as to admit of its being worked by tunnels, thus enabling the miner to deliver his ore at the mills without exposure to the weather. The Canadian trans-continental railway may now be considered a fixed fact. The road will traverse this region. Exhaustive surveys have been made, and a portion of the road, Pembina, already constructed. Barke



Elevation of ledge at this point, 1,200 feet above bed of Lowhee creek; width of ledge on the surface, 18 to 20 feet; 9 represents the location of the Lone Star Co.; 10, Pinkerton Co.; D is the Victoria gravel mining company's shaft. At a depth of 130 feet the ledge was struck in a drift and found to be 30 feet wide; assays averaging \$36 per ton; 11 is the American Co.'s ground; 12, Cariboo Quartz M. Co.; A, is the tunnel of the Cariboo, cutting the ledge 52 feet below the surface. At this point the vein is 22 feet wide, giving assays ranging from \$14 to \$155 per ton; average, \$33. No. 13, is the St. Lawrence M. Co.; 14, Wintrip Co., Crown grant; 15, Black Jack Co., Crown grant. On the Steadman ledge, No. 1 is the McKenzie Co.; 2, British Columbia M. & M. Co.; 3, S. Walker; B, croppings, assayed \$20 to \$30 per ton and worked \$13.25; ledge five feet wide. No. 5 is the Cariboo Quartz M. Co.; and 6, the Consolidated Virginia Co.

the mountain back of Barkerville. The ledge is a true fissure vein with well defined walls, and has been traced for a distance of five miles. The Cariboo Quartz M. Co.'s tunnel has cut the ledge at a distance of 52 feet from the surface. At this point the vein is 22 feet in width, with assays ranging from \$14 to \$155 to the ton. The average assays across the vein show \$33 per ton. The ore is a soft quartz, carrying free gold and sulphurets, with a slight trace of silver. A four-stamp mill, with imperfect appliances, has been busily engaged in running upon rock from this claim for most of the time since October 8th, 1877, with the most satisfactory result. The gross yield for two months to December 1st, may be put down at \$5,000. The company has decided to erect a first-class 20-stamp mill at once, and Mr. Harper is now having the plans and specifications prepared in this city. Adjoining the Cariboo claim on the south is the St. Lawrence location of 1,500 feet. In this

Cariboo location. Where exposed by the Victoria shaft it is 30 feet wide, averaging \$36 per ton in gold, with traces of silver. The British Columbia mill and mining company have decided to order a 20-stamp mill. The Enterprise mine lies next to the north of the Pinkerton, is being energetically developed and a mill will be erected. There is probably no doubt that the Big Bonanza ledge is the feeder of the famous Williams and Lowhee creeks, and the mother lode of the country. The yield from these creeks since 1862 amounts to the astounding sum of \$40,000,000. All placer gold is made up of particles and detached fragments which once formed a part of some vein, and from which they have been detached by various mechanical causes, especially by the action of currents of water. The creeks below the ledge were astonishingly rich, and it is a fair inference that this ledge was the source of the placers. The conditions for successful quartz

ville is connected with San Francisco by wire, and communication with the mines can easily be had at all time. The telegraph line to Barkerville was constructed by the Western Union Telegraph Company some years ago, when that corporation was endeavoring to build an overland line via Behring's straits to Asia. The scheme was abandoned after the Atlantic cable was successfully laid and the line as far as built turned over to the Provincial Government. Mr. Harper represents that there is great rejoicing among our neighbors over the new developments. Property has advanced in Victoria and elsewhere in the province, and British Columbia seems to have entered upon a new career of prosperity. It is a matter of great congratulation that another productive gold region has been opened, as San Francisco must feel the benefit of such discoveries in the demand for mining machinery and mining supplies of every description.



CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents—Eds.

The Mines of Colorado.

Facts and Figures Regarding the Gold Mines of Gilpin County.

EDITORS PRESS:—The yield of the gold and silver mines of Colorado for the year 1877 was, according to the statement of John J. Valentine, of Wells, Fargo & Co., \$7,913,540. This is in currency value, and reduced to gold value it would amount to \$7,554,692. It is by far the largest product ever obtained from the mines of this State. The largest previous yield was that of 1876, viz: \$6,191,907. For the five preceding years it was as follows: 1872, \$3,600,000; 1873, \$4,070,000; 1874, \$5,362,000; 1875, \$5,486,000. An unusual degree of prosperity prevails throughout Colorado, not only on account of general success in the mining districts, new and old, but also on account of the most bountiful crops ever known here, and of heavy sales and shipments of beef cattle to the East. For the first time in the history of this region, enough wheat and produce was raised for home consumption, with a small surplus over.

The accuracy of Wells, Fargo & Co.'s figures cannot be ascertained yet, but it is evident that they are not far out of the way. Not having obtained the exact figures from all parts of the State, I will send you the figures of Gilpin county, which I have gathered with much care and no little trouble, and whose correctness I can vouch for. As with the State, the yield of this county, which embraces the leading gold district, and the contiguous towns of Central, Black Hawk and Nevadaville, has greatly increased. The total yield of this district since its discovery in 1859 is over \$32,000,000, coin value.

The actual shipments from Central or Gilpin county in 1877, was as follows:

Gold retort from quartz mills.....	\$1,277,932.81
Gold dust from gulches.....	40,000.00
Gold from Clear Creek county.....	21,262.05
Gold and silver bars from the Boston and Colorado smelting works.....	2,056,324.56
Ore sold to Golden smelting works.....	80,000.00

Total.....\$3,475,519.42

Of the above amount, \$1,299,543.69 came from ores from other counties, treated at the Boston and Colorado smelting works, at Black Hawk, with the exception of \$21,262.05.

The following is the actual yield of the mines of Gilpin county for the year 1877:

Gold.....	\$1,931,620.15
Silver.....	161,255.36
Copper.....	82,100.20
Lead.....	1,000.00

Total.....\$2,175,975.71

The above came through the following channels:

	Tons of ore.	Yield.
Twenty-two quartz mills.....	140,700	\$1,277,932.81
Boston and Colorado smelting works.....	9,500	778,042.92
Golden smelting works.....	1,500	80,000.00
Gold dust from gulch mines.....		40,000.00
Total.....	151,700	\$2,175,975.73

* Nearly half of this tonnage was in buddled tailings from the quartz mills.

All of the figures given in this article are gold or coin value, excepting the following statement of the production of the Boston and Colorado smelting works, which are given in currency value because that was the way it was received from Profs. Hill and Walcott, managers of the company. Wherever any portion of these figures are used elsewhere in this article they are reduced to coin value, allowing an average premium of gold for the year of four and three-quarter cents.

Statement of the production of the Boston and Colorado smelting works at Black Hawk for 1877, showing the amount of the various metals produced, and the amount due to the credit of the several counties from which ore was received:

Counties.	Gold.	Silver.	Copper.	Total.
Gilpin.....	\$591,500	\$137,500	\$86,000	\$815,000
Clear Creek.....	6,500	707,000	3,000	710,500
Park.....	38,000	221,500	3,000	263,000
Boulder.....	169,000	90,500		259,500
Custer.....	14,500	70,500		91,000
Other sources.....				4,000

Total.....\$810,500 \$1,233,000 \$97,500 \$2,154,000

The hullion from these works is the finest turned out by any reducing establishment in America. The bars of silver with the stamp of these works upon them are marketable in all home and foreign ports, as they are not required to pass the New York assay office to fit them for commerce. They are shipped to the Fourth National Bank of New York, which guarantees them to Belmont, agent of the Rothschilds, or for any other purchaser. The gold is shipped in bars containing a trifle of copper, and are valued at from \$14,000 to \$24,000 each. These works were established in 1867 on a small scale. They now have over 20 furnaces, five of which are for smelting, and employ 120, men besides wood-bauers. Their total product from the beginning has exceeded \$12,250,000. Last year they treated very nearly 16,000 tons of ore, including 4,500 tons of bud-

dled quartz mills tailings, or an average of 44 tons daily for the entire year. One smelting furnace and four calciners, or roasting furnaces, were added last fall.

The stamp mills treat nearly all of the ore from the mines, which is of low grade and requires cheap treatment, in order to retain a profit. Twenty-two mills were in operation in Gilpin county last year, with a total of 665 stamps. Most of these were in operation constantly, night, day and Sundays. The average number of stamps in operation throughout the year was 597, crushing one-tenth of a cord or about three-fourths of a ton of ore every 24 hours. There were 20,100 cords treated, or allowing seven tons to a cord, 140,700 tons, and the average yield was \$74.10 per cord, or \$10.58 per ton. The average saving of the stamp mills is from 50% to 60%, and sometimes nearly 70%. The amount of silver and copper saved is small. The smelting works save 97% or more of the gold, silver and copper, and treat the high grade or picked gold ores, and such silver ores as they can buy, on the same basis of a charge of \$30 or \$35 per ton, or more in case of very rich ore. The quartz mills charge from \$18 to \$22 per cord, which amounts to the same as \$2.30 or \$3 per ton. The Briggs and Bobtail companies, who have their own mills, mine, hoist and mill their ore at a cost of \$5 per ton or less. The cost at the Kansas and Gunnell is but little more. About 1,400 men are employed in mining and milling in Gilpin county.

The yield of the Bobtail lode for the year was about \$350,000, of the Gregory and Gunnell not much less than \$250,000, and of the Monmouth, part of the Kansas, about \$120,000. The Kent County, Comstock and Burroughs, produced largely. There were 100 other mines worked, among which the Lewis, Shanks, Smith, Minnie, Omaha, Bugher and Fourth of July, have paid largely.

Lately four mines that have produced in former years nearly or quite 500,000 each were opened. They are the Alps, California, Gardner and English-Kansas. These have all been idle for years, but are now being worked on a large scale. The first is already paying, and the others soon will be. These mines will soon require 150 stamps for milling purposes, and it is thought they and the Bates, and others soon to be worked again, will swell the bullion product of the county to \$3,000,000 in 1878.

Central, Colorado, Jan. 7, 1878.

American Capital in Chilean Mines.

EDITORS PRESS:—I have special instructions from the President of Chile, Don Anibal Pinto, to do all I can to induce Americans to go out to Chile. They will be well received. The Prime Minister, Dr. Jose V. Lastarria, writes me that almost all his time is devoted to the mining interests of the country, and that these will in future have the greatest protection from the Government.

I will give letters of introduction to my brother, John Sewell, of Valparaiso, where we have a mining office at No. 102 Cochrane street, to all such desirous of going to Chile; provided they are prepared to do so, by taking some means of their own, and with expectations of being backed by rich men. Otherwise, I would advise men to remain at home. It takes about \$350 to reach Valparaiso. A great inducement is that Chile has the same climate as California, only it is less warm. In fact, there is everything to make mining profitable. We have the richest silver and copper mines in the world. Samples of silver ores I brought from Chile are very rich, and have been exhibited in San Francisco and would convince the most incredulous. They have been left for inspection at the Nevada Metallurgical Works of Messrs. Huhn & Luckhardt, No. 23 Stevenson street.

As you already know, the placer mines at Catapilco, Chile, have been sold to La Ligna G. M. Co. of New York, and they are preparing to erect large and expensive hydraulic works. From working tests the gravel deposits at Catapilco average 50 cents to the cubic yard of gravel. A 400-horse power engine will be employed to pump the waters from Catapilco lake to an elevation of 450 feet, where over 10,000,000 gallons of water will be deposited in a reservoir every 24 hours; from this reservoir two 15-inch pipes will supply four of Craig's nozzles. The sluices are to be paved or lined with old railroad iron, and all the works are to be first-class in every particular. The new company is a "close corporation," formed principally of Eastern capitalists, who have employed an experienced Californian hydraulic miner to superintend their works in Chile.

The great advantage of most of the Chilean gold diggings is their proximity to the coast, commencing a few blocks from the shore and extending back into the country some 15 miles. They are richer than most California diggings. Labor is three hits per day. Chile is the land for cheap provisions, railways, good wagon roads, etc. The diggings are situated some 30 miles to the north of the principal seaport, Valparaiso, and can be reached by a steam launch in four hours. By railway from Valparaiso and stage, the journey can be accomplished in eight hours.

When I was in Salt Lake City in September last, I was interviewed by several friends of Harry Holcombe, all desirous of starting for the Chilean diggings. I advised them to wait until I could give them positive news of the

arrival in Chile of the promoters of the two companies. These gentlemen have now returned to New York and the properties have been accepted. Mr. H. Holcombe remains in Chile as manager. Two of these Salt Lakers were ready to start for Chile, having scraped together \$1,000 a piece. I warned them that Chile was not like California for wages, if they got broke they would have to work for three hits a day. That it would be better for them to get some rich men in with them, who would give them \$2,000 each, and go out there under the condition that, if they got hold of a good property, a Californian should then be sent out to inspect, and in case of approval, send \$50,000 to \$100,000 for working on a large scale. No hydraulic work has ever been carried out in Chile; nothing but the pan. As to gold quartz mining, I never came across a Chilean gold quartz mine that had ever had hoisting works or a pump. Yet in the time of the Spaniards Chile was the greatest gold-producing country in the world.

The question then naturally arises, if Chilean diggings and gold quartz mines are richer than those of California, how is it that the rich Chilean miners of copper and silver have never attempted working either of these great industries of the country that made their fathers so fabulously rich? These industries were abandoned at the time of the war of liberation from the mother country. At that period no vessels were allowed to trade with Chile except Spanish, and all other countries were excluded from bartering their goods. Immediately after the war of independence, English vessels arrived in Chile from England and India, bringing with them goods of all classes from those two countries. These were freely offered in exchange for copper, in which the country abounded and easily mined. Money and goods were advanced by the English against copper, and therefore the natives had no inducement to go into gold mining again. This requiring machinery and great outlays to make it profitable, they took to copper mining, and have continued to this day, and are now the greatest producers of that metal, turning out 60% of all the copper produced by the world. Three hundred million dollars' worth of copper have been produced by Chile in the last 30 years.

HENRY SEWELL, M. E.

Palace Hotel, San Francisco.

A Year's Work in the Bonanza.

Annual Meeting of the Consolidated Virginia Mining Company.

The annual meeting of the Consolidated Virginia mining company was held on the 10th inst., there were 482,586 shares represented. The financial report for the year was read as follows:

RECEIPTS.	
Gross product—Yield of mine for year.....	\$13,734,019 07
Ore sales—Sundry ores sold during the year.....	68,205 38
Assaying—Received from sundry parties for assaying.....	62,424 31
Balances outstanding last annual meeting, since settled.....	35,012 79
Total.....	\$13,899,657 55

DISBURSEMENTS.	
Cash and bullion sales in hand of Superintendent in Virginia.....	\$ 10,743 80
Cash in hand in San Francisco office.....	1,353 25
Nevada Bank—Balance in hands of Bank Cashier.....	1,088,349 01
Virginia office expenses.....	3,134 45
Team account.....	1,271 20
Ore purchase.....	93,933 53
Surveying.....	700 00
Assay office expenses (Virginia).....	33,209 00
Books and stationery.....	1,574 45
Legal expenses.....	29,907 00
Advertising.....	109 50
Water.....	6,000 00
Real estate.....	1,652 00
Hoisting, balance paid above receipts.....	3,142 14
Taxes.....	282,579 33
Reduction (crushing ore).....	1,440,188 00
Interest and exchange.....	80,334 30
Bullion freight.....	48,402 19
Dividends Nos. 33 to 40 inclusive.....	8,640,000 00
C & C shaft.....	131,000 00
Bullion district.....	975,416 05
Supplies.....	391,505 87
Salaries and wages.....	615,545 50
Expenses incidental to San Francisco office.....	5,265 43
Total.....	\$13,899,657 55

The report was adopted.

The following gentlemen were elected Directors of the company: George Wallace, Sol. Heydenfeldt, Geo. R. Wells, Cornelius O'Connor and Chas. H. Fish.

E. C. Platt offered the following:

Resolved, That all matters and things, acts, contracts and agreements heretofore made and entered into, agreed upon or executed by the Board of Trustees of this company, be and the same are hereby ratified, approved and confirmed.

The adoption of the resolution was opposed by S. P. Dewey, on the ground that if the Trustees had been faithful in the performance of their duty, there was no occasion for such a resolution and if they had not been faithful their acts ought not to be glossed over.

Mr. Dewey was interrupted by calls for question, and the resolution was adopted.

Protest Filed.

The following protest was handed to the Secretary, but not read:

The undersigned protests in his own behalf and in behalf of those whose interest he represents, against the passage of any resolution or resolutions tending to confirm, ratify or approve the matter and things, acts, contracts, transactions and disbursements agreed upon or executed by the Board of Trustees of the Consolidated Virginia mining company during the past year.

S. P. DEWEY.

The meeting then adjourned. Subsequently the Trustees held a short session.

The President's Report.

The following is the report of the President: To the stockholders of the Consolidated Vir-

ginia mining company: Since the time of your meeting several changes have been made in the Board of Trustees. Flood, Mackay and O'Brien have resigned. The vacancies were filled by Messrs. George Wallace, Geo. R. Wells and Cornelius O'Connor. No dividends were paid in 1877 until May 14th, when payment was resumed and monthly dividends of \$2 per share have been paid to date. The following statement shows the total amount of bullion and when produced:

	Gold.	Silver.	Total.
1873.....	\$ 314,283 68	\$ 331,293 49	\$ 645,577 17
1874.....	2,063,433 13	2,918,045 92	4,981,478 05
1875.....	7,035,206 54	9,682,188 22	16,717,394 76
1876.....	7,878,145 36	9,279,504 11	16,657,649 47
1877.....	6,270,513 08	7,463,500 30	13,734,013 07

Grand total.....\$52,730,129 52
Dividends paid, \$35,640,000.

Again, it becomes necessary to remind non-resident stockholders that we cannot remit dividends by mail or express. The company has no Treasurer. Drafts can be drawn upon the Secretary through any bank in this city. Stockholders in Boston and New York can draw their dividends without cost or delay by having their stock issued in the name of James Coffin, Trustee. Mr. Coffin is trustee for mining stock owned by the Nevada Bank and many brokers in this city. The Traders' National Bank in New York city will pay dividends on stock standing in the name of Coffin upon presentation of certificates. The condition of the bullion market during the year made it necessary at times to retain the bullion and pay dividends by overdrafts. The item of interest on disbursements is consequently large. Your attention is respectfully called to the reports of the Superintendent and Secretary herewith submitted. CHARLES H. FISH, President.

The Superintendent's Report.

Following is from the report of Superintendent Fair:

VIRGINIA, NEV., Dec. 31st, 1877.

Mr. Chas. H. Fish—President of Consolidated Virginia Mining Company—DEAR SIR: The total quantity of ore which has been taken out from the Consolidated Virginia mine in the past year ending December 31st is 144,400-2,000 tons. The were on hand in the ore-bouses and at the mills at the beginning of the year 200-2,000 tons. There have been reduced 143,200-2,000 tons, yielding bullion of the value of \$13,734,010.07, or \$95.90 8-10 per ton—this yield being 73 3-10 per cent. of the assay value of the ore, no allowance having been made for wet ore. We have now on hand in the ore-bouses and at the mills 1,400-2,000 tons valued by assays at \$171,560. The value of the gold contained in the bullion produced was \$6,270,518.68, and of the silver, \$7,463,500.39.

All the ore extracted was taken from the 1200, 1300, 1400, 1500, 1550, 1650 and 1750-foot levels of the mine.

The 1200-Foot Level.

This level has been re-opened during the past year by running a large drift from the Gould & Curry shaft to our main shaft, a distance of 1,530 feet. To work this level we were compelled to connect with the Gould & Curry shaft for ventilation, and all the ore from this level has been taken out through that shaft. The ore-breasts on this level are very extensive, and as we rise above the sill-floor the ore widens to the east. The ore has been followed south from the ore stopes more than 175 feet.

The 1300-Foot Level.

Considerable work has been done on this level in crosscutting the ore body, and much ore of fair quality has been developed. Much more exploration will have to be made, however, to obtain a definite knowledge of the extent and value of the ore which yet remains in place.

The 1400-Foot Level.

From this level a very large quantity of high-grade ore has been extracted during the year, and a vast quantity yet remains in place. The work of extracting ore from this level has heretofore been attended with much difficulty, owing to the crushing of the ore stopes by the pressure from the east, and from the waters which accumulated in large cavities in the rock east of the ore body. This water has frequently broken in through the east clay, flooding the stopes, and doing great damage and causing many delays. All this trouble is now ended, as the water is now drawn away through the drift on the 1500-foot level—run from the C & C joint shaft. In addition to the ore which has heretofore been worked on this level, a body of ore 60 feet in width has been developed to the west. It is of high grade, and how far it may extend south and upward is unknown. From all indications it promises to be extensive.

The 1500-Foot Level.

On this level a drift has been run south from the main shaft 200 feet, and connected with the east stopes. A lateral drift has been run south, on the west side of and adjoining the ore stopes. From this lateral drift raises have been made, connecting with the level above, for air and for ore chutes. Considerable ore has been encountered in extending these openings.

The 1550-Foot Level.

A large quantity of ore has been extracted from the southern part of the ore body on this level, and the end of the body in that direction has not been reached. Work on the ore-breasts here was discontinued several months ago on account of had ventilation. A large working drift and air gallery has just been completed,

Continued on page 39.

MECHANICAL PROGRESS.

Thimble Making.

This is an interesting piece of mechanics' work which we do not remember to have seen described before. We are indebted to a writer in the *Polytechnic Review* for the following facts: To make a silver thimble we will say that a trade dollar is taken. (Half-dollars are not so pure.) It is rolled out rather longer and thinner; a planchet is cut out by a fly press. A punching press next upsets it (just as making metallic cartridge cases) into a cylindrical cup. As silver is not as ductile as copper, it is then annealed. A second punch works it out into a cup; a second annealing prepares it for a tapered punch, which makes of it a conical cup. Being chucked in a lathe on a steel cone, a cutting wheel on the end of a lever turns off the burr end; a hook tool on a lever turns back the rim, and a grooved wheel rounds it. (Very wide rims are hard-soldered on.) A diamond-pointed tool turns off the end and sides and an oiled steel tool polishes the newly turned surface. Next a knurling tool—a narrow rimmed wheel on a suitable handle—indents one ring at a time the concentric rings of pits in the end; the noise produced by this tool being somewhat in a gamut, the outer circle producing quicker vibrations and hence higher tones. A side knurler with beveled fan and with several rows of projections produces the side indentations; an inside tool is used, if the thimble be very thin, to smooth out the projections caused by the knurling. These pits could not well (as one might imagine) be stamped in, as this process fails to give the required sharpness of outlines; furthermore it would make the ridges less dense than the bottoms of the hollows, and hence more likely to wear away quickly. A cording wheel makes a rope-like fillet, and other varieties of knurling wheels produce "matt" surface, bead-fillets, etc. Some establishments solder on the tips, but it is claimed that this is not as substantial as striking up from the solid. Other ornamentation than that of the lathe may be given by what is called *chasing*, dull-edged chisels being worked along by a twist of the wrist, so as to produce broken lines, diagonal or otherwise. After boiling in soap-suds to remove the oil, the thimbles are brushed, and are then ready for the market. Gold thimbles cannot be punched from the planchet by the same press that "draws" the silver ones, but the blanks are drawn in a hand-fly press. They must be more accurately made than the silver, as they must not vary a weight more than a very few grains to the dozen.

Oven Builders.

There are few vocations of such a distressing character as that of the oven builder. At the best of times, when he is engaged in building a new oven and is not subjected to the intense heat that usually accompanies operations in one already constructed, he is compelled to work in a painfully constrained position, and this is rendered more intolerable when having to replace broken tile or repair a fissure in the roof, he is obliged, by the exigencies of the baker's business, which will not permit him to let his oven stand several days to cool, to perform the job in a condition of temperature that to ordinary persons would be unendurable. In operations of this nature oven builders always work in couples. Placing a flour sack rolled up at the mouth of the oven, the workman crawls into the chasm on his stomach, unfolds flat before him, and then, resting upon it, wriggles himself or is pushed into the place where the repair has to be effected, while his comrade, standing at the door, ready to pull him out should he be overcome by the heat, hands in the tools as he requires them. Great care has to be exercised in using the latter. If left in the oven long they become too hot to handle, and in consequence, together with the mortar and other repairing material, are always kept outside until actually needed. After working about five minutes the signal is given, and the man hauled out by the heels, throws himself upon the dough-board, where a sort of bed of flour sacks has been improvised for the occasion. Among these he buries himself to prevent his catching cold, and for a few moments his writhings alone testify the stress of suffering to which he has been subjected. The effect of the heat is more appreciated when, on emerging from the sacks to refresh himself in a copious draft of beer, his clothes are found to be literally dripping with perspiration. The wonder is that men should be found willing to devote themselves to such a business as this, but the wages are high, and, in spite of the suffering the work entails, as much competition exists in the oven building trade as in other walks of life.

A "TOLLING" MACHINE.—In the current number of *Fors Clavigera*, Mr. Ruskin gives the following note from a correspondent: "Here's a good thing for 'Fors.' A tolling-machine has been erected at Ealing cemetery at the cost of £80, and seems to give universal satisfaction. It was calculated that this method of doing things would (at 300 funerals a year) be in the long run cheaper than paying a man threepence an hour to ring the bell. Thus we mourn for the departed!"

A Premium for Inventors.

We notice that the people of South Australia are thinking of offering a premium of \$20,000 for a combined machine which will reap, thresh and sack their grain. This problem has already been attacked by California inventors and with considerable success and we hope that the premium will be decided upon and fall into the hands of a Californian. To give all notice of the possible chance for their inventive skill we quote from the *Adelaide Observer*, just received, as follows:

"The experience of the past year has shown that South Australia will have much greater difficulty than has hitherto been the case in competing successfully for the breakfast supply of the English markets. Transit has now become so rapid and so cheap that other countries, such as India and America, which annually produce a large surplus of grain, are able, from their geographical position, and the cheap rate at which they can grow wheat to send off their abundance to Europe at a price that it is almost hopeless for us under present circumstances, to attempt to rival. We are glad, therefore, to notice that Mr. Darling has brought before the House the question of the desirability of offering a government bonus for the invention of the best machine for reaping, cleaning and bagging wheat on the ground. As pointed out by him, the winnowing and bagging of the wheat at present is really the most costly part of the harvest operations, as it takes at least two men to manage a winnower, whereas but one is required for a reaper. He considers that if one machine did the whole of the work two men in place of three would be required, the result being the saving of about £70,000 on the harvest throughout the colony, and the setting free of a number of men for other occupations whenever their services are much wanted. Nor would it appear that such a machine is in any way an impossibility, as something of the kind has already been invented and tried in the colony. There can be no question that when a perfect combined reaper, thresher and cleaner is constructed its value to the colony will be cheaply gained by the expenditure of £4,000. We trust, therefore, that the motion of the bonus will be assented to, and that the money will be speedily claimed."

ONE-LEGGED RAILWAY.—An Oil City *Derrick* correspondent describes the elevated one-wheeled, or, as it is more generally known, "one-legged railroad," now being constructed by Gen. Stone in the Bradford oil region. It is attracting a good deal of attention, and there is much speculation as to the probable success or failure of the enterprise. A portion of the line between Bradford and Tarpot is completed, and one car of peculiar construction has arrived and been placed on the track. The construction of the road is simple, rapid and easy. On the hard ground, logs six feet long and from a foot and a half to two feet in diameter are placed at right angles to the line, and from 12 to 15 feet apart, the distance varying. In these logs vertical sawed posts, 14 by 15½ inches, are dovetailed and wedged. These verticals vary in height, and by their length the grade of the road is regulated. On the top of these verticals the horizontal pieces to which the rails are spiked are laid, with their ends squarely against one another. These sleepers are 10 inches wide by 15½ in thickness. By a proper arrangement of vertical and horizontal pieces of timber the timbers on which the rails are laid are kept firmly in position, and two wooden rails, three feet and a half below the top of the iron rail and 22 inches apart, are spiked to the vertical posts. Across streams and the swampy ground piles are driven. On this one rail a saddle-shaped car is mounted and supported by two wheels, double flanges. The gondola car now mounted on the portion of the road completed is 22 feet long, nine feet wide, and weighs over 7,000 pounds. The car is a double-decker, there being room for freight in the body of the car, and on each side of the saddle. Twenty-two inches below a plane tangent to the upper wheels, at the lowest point of their circumference, four smaller wheels are placed in a horizontal position, and in the same plane, their circumferences being 22 inches apart. These run against the wooden guide rails, and keep the car in position. The wheels are attached to standards connected with the iron framework of the car.

AMERICAN CARS IN ENGLAND.—Our London exchange, *Iron*, says: The teaching of the accident to the Scotch express on Tuesday last, would appear to be that one should always travel in the middle of the train, and, if possible, in a Pullman car. Several persons were more or less severely injured, but those in the two Pullman cars, "Australia" and "Midland," were quite uninjured. Those passengers who were sleeping in the "Australia" were not, indeed, aware that any accident had happened until the train came to a standstill and they were awakened to a sense of the danger they had gone through. It must be recollected that the accident was a severe one, the engine having left the rails and plowed the earth for nearly 300 yards, smashing rails and sleepers alike. Everybody seems to have been more or less shaken and otherwise hurt, except the fortunate occupants of the Pullman cars.

SCIENTIFIC PROGRESS.

The North America Unionides.

EDITORS PRESS:—At the recent meeting of the Washington Philosophical Society in this city, Dr. C. A. White, paleontologist of the Hayden Geological Survey, delivered a short address on some phases in the evolutionary history of the North American Unionides.

He commenced by a comparison of the Unionides of North America with those of other parts of the world, showing that the types in which their variation is expressed are not only numerous and varied, but many of them are peculiar to North American waters. The greater part of these types, which coneobiologists in all parts of the world recognize as North American, are found only in the great Mississippi river system and in the Red-river-of-the-North. Then giving a table of the mesozoic and cenozoic formations of western North America on the blackboard, he explained that collections of fossil Unionides have been made from nearly all the mesozoic and all the cenozoic formations of the great Rocky mountain region; their abundance increasing with advancing time. All the species are different from any of those now living, but they are all so similar in type as to leave no doubt that the fossil forms represent the living ones ancestrally. Some of these fossil Unios, especially the earlier ones, are found in layers of formations that contain marine forms with few or no other exceptions, but they have been mostly obtained from the great lacustrine deposits of the tertiary and late cretaceous periods.

The great Laramie group, representing the closing epoch of the cretaceous, or the commencing one of the tertiary period, has proved to be especially rich in fossil Unios of North American type. This great group of strata, reaching a maximum thickness of 3,500 feet, was deposited mainly in brackish waters, as evidenced by the following facts: 1st. The absence of true marine forms, but the presence of *Ostrea* and *Anomia* throughout the whole thickness of the formation. 2d. The common occurrence of the genera *Corbula*, *Corbicula* and *Neritina*. 3d. The presence but more restricted range of the genera *Goniobasis*, *Viviparus*, *Sphaerium* and *Unio*. Those of the third category are occasionally found alone, but usually associated with those of the second, and not unfrequently with those of the first also; and so associated as to make it evident that they all lived and thrived together in the same waters. The abundant and almost constant presence of the *Ostreidae* gives satisfactory proof that the waters were, in at least some degree, saline.

Dr. White advanced the idea that although the Unionides may now be found only in purely fresh waters, the great and varied differentiation of these ancient representatives of the family probably took place under the influence of the salt in the waters in which they lived; and that the family, once having impressed upon it these types, they have been hereditarily preserved through extraordinary vicissitudes of environment to the present day, and therefore did not originate in the waters where they now exist.

The history of these North American types of Unio antedates that of the Rocky mountains, for the strata in which they are found have been displaced by the movements that resulted in the elevation of those mountains. They have witnessed, so to speak, the origin and extinction of those wonderful families of vertebrates, of that great region, which have been made known by the labors of Marsh, Cope and Leidy. When the continent was gradually emerging from the sea, a large portion of what is now western North America was almost or wholly enclosed by the rising land and cut off from the open ocean. Thus a great, brackish, inland sea was formed, hundreds of miles across, in which the strata of the Laramie group was deposited. This sea finally became entirely fresh, when the strata of the Wasatch, Green river and Bridger groups were deposited. By further movements of the earth's crust and the action of denuding forces, these great lakes became entirely drained. Some of the streams that now constitute portions of the Mississippi and northern Red river drainage systems, were doubtless channels of drainage overflow of those ancient lakes; and through these, by an unbroken line of hereditary descent, the Unionides of North American types have reached their present habitats.

Washington, D. C., Dec., 31st.

Gallium.

This element of recent discovery, was the subject of a paper before the English Chemical Society by the distinguished chemist Prof. Odling. He says: Gallium was discovered by Boisbaudran, 27-29th, August, 1875. It was first obtained in the metallic state in November, 1875. Spectrum consists of two bands in the violet; one brilliant, of wave-length 417, and a feeble band, of wave-length 403.3. It was extracted in the first instance from zinc blende of Pierrefitte, a mine in the Pyrenees, afterwards from a black blende of Bensberg on

the Rhine; the latter contains one part in 100,000, the former one in 400,000; 0.65 grammes of gallium being obtained from 430 kilogrammes of Pierrefitte blende. In appearance it resembles lead, but is less blue, tarnishes slightly on exposure to moist air, it is slightly harder than lead, flexible, malleable, and can be cut with a knife. It is not appreciably volatile at a red heat and is but slightly attacked by oxygen at that temperature. Its specific gravity is 5.9; when fused, 6.08. It melts at 30.15 C., presenting a brilliantly white appearance; when once fused it remains liquid, even for several months, at 0° C., but is immediately solidified when in this condition by contact with solid gallium. In consequence of this curious phenomenon of surfusion, the element was at first described as a liquid metal. Crystallizes in square octohedra. In properties it is more or less intermediate between aluminium and indium. The solutions of its salts give the following reactions: With ammonia: a white gelatinous precipitate, soluble, but not freely, in excess. Potash: a similar precipitate, soluble in excess. Acetate of ammonia, on boiling in a solution avoiding excess of acid precipitates a basic compound. Carbonate of baryta easily precipitates the salts of gallium in the cold. The salts already prepared are the sulphate, which is very soluble but not deliquescent; the chloride, very soluble and very deliquescent, decomposed by a large excess of water, and the alum; a solution of the latter on heating deposits a basic sulphate, which goes up again on cooling.

The Government Geographical Survey.

The various parties engaged in field work during the past summer under Lieut. G. M. Wheeler's corps of Engineers in charge of the geographical surveys west of the 100th meridian, have returned to this city, and have already commenced the preparation of their reports from the extensive notes and observations made in Colorado, Texas, Nevada, California, Oregon, and the Territories of New Mexico, Utah, Wyoming, Idaho and Montana. The work during the past season has been a continuation of its topographical work of the previous year, and the notes thus far made will enable the parties to prepare a detailed map covering an area of about 30,000 square miles. On account of the favorable season and increased strength of the parties, the explorations of 1877 have been more successful than during any previous year. A new feature of the survey will be a report upon the quantity of arable, arid, timber, grazing and mineral lands examined during the season. Geological and zoological examinations were also made in various sections. A special party made a careful survey of the Comstock lode, both above and below the ground. A map of the surface has been furnished, and a profile of the mining lodes, with plans of the separate levels, and a general longitudinal section of the entire vein, have been commenced. It is proposed to continue this branch of the survey until a complete history of the mining operations at this locality, especially, shall be completed, including the underground examination of all the various openings by shafts, and especially the Suto tunnel, now nearly completed. The party which was engaged near Lake Tahoe has completed data for a special map of this interesting lake region. The number of main and secondary triangulation and other stations occupied exceeded that of any previous year. A temporary field office has been established at Ogden, Utah Territory. Volume 4 (Paleontology) has been issued, and volume 2 (Astronomy) will soon be ready. A number of maps have been issued during the year, which have been found to be of great use, not only to the Government, but to those seeking homesteads on the Western frontier. Following are the names of officers who were in charge of the parties: Lieuts. Bergland, Tillman, Symons and Young, of the Engineer corps; Lieuts. Bornie, Morrison and Macomb, of the army. Among civilian assistants were Profs. J. A. Church, A. R. Conkling and Dr. Kaupf.

WINGED PHYLLOXERA.—The *Comptes-rendus* of the Academy of Sciences contain a notice of M. Boiteau's most recent observations on the phylloxera. The winged insects among them are this year especially numerous, and, whatever people may say to the contrary, are capable of a sustained flight, as anyone may witness on a bright afternoon in summer by placing himself near the infested vines, with the sun shining in his face. The flight of the myriads of insects playing around will be found to be regular, continuous and rapid, and the capture of some of these by the hand will prove that nearly all of them are phylloxeras. M. Boiteau has also found quantities of winter eggs, the very existence of which is still denied by many observers, and, so far as his opportunities of research have extended, it seems probable that they are deposited exclusively on the external part of the stocks.

AMERICAN PROGRESS IN SCIENCE.—The *Chemical News*, London, warmly praises the exertions made by the local and general governments of the United States for the advancement and diffusion of science, and calls especial attention to the fact that the Massachusetts Institute of Technology has provided special laboratories for the instruction of women in chemistry—analytical, industrial, and physiological; in botany, mineralogy, microscopic manipulation, etc.; and it gives credit for the work done in this department by the ladies.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

GROUND SLUICING.—Amador *Dispatch*, Jan. 12: The work of ground sluicing was commenced by some parties on the flat, in Walker's ranch, between Jackson and the Gate, a few days ago. It is thought that this ground will pay from \$6 to \$10 per day to the hand.

THE MONTERICHARD MILL.—We understand that the work of laying the foundation for the new ten-stamp mill at the Monterichard mine was commenced last Wednesday. The engine, boiler and other machinery are already on the ground.

IRON PIPE.—A large amount of new iron pipe passed through town last Wednesday, which is to be used in conveying water to the old Moore mine for the purpose of running the new hydraulic hoisting works now being put up by Messrs. Hewitt & Hill.

PHENIX.—Amador *Ledger*, Jan. 12: The ice king relaxed his grasp of the Phenix stamps on Monday, so that the 80 stamps are now crushing ore. The management of both mill and mine, in the judgment of mining experts, could not be better. The gravel claim at Humbug hill, between the Kennedy and Oneida mines, owned by James Meehan and others, is being fitted up for hydraulicing. The iron pipe from Sharp & Boxall's claim is being moved on the ground. No clean-up of the Kennedy has been made yet; but reports are circulated that the plates are looking well, and the stockholders feel greatly encouraged.

NEWTON COPPER MINE.—Everything around these works appears to be moving along prosperously, with the exception that the underground operations are at a standstill, pending the disposal of the large quantities of low-grade ore which have already passed through the roasting process, and are now awaiting precipitation. The steam elevator and car track, just completed at a cost of several thousand dollars, are in daily operation, and answers admirably. The Superintendent informs us that there are 8,000 tons of ore above ground. To extract the metal from this pile will occupy until the opening of spring, at which time underground work will be resumed.

BACHELOR GRAVEL CLAIM.—On Saturday last we paid a visit to the Bachelor gravel claim, half a mile south of the Lone toll road. W. P. Hays and other parties interested are putting the claim in working trim at no little outlay in money and labor. There is undoubtedly an auriferous channel in the vicinity, as demonstrated by a tunnel driven into the hill 150 feet or more. The gravel in places looks very rich, and we are told that it prospects fairly throughout. Sluice boxes are in position, and all that is now required to set the mine in full blast is a supply of liquid from the canal. The connecting ditch is progressing at a satisfactory rate, also a reservoir. In a week or so the claim ought to be in working order. The mine, as its name implies, is isolated and lonely. There is neither a quartz nor a gravel claim within a radius of miles. The owners are plucky in opening it up in so thorough a manner; but they know what they are about, and expect ample compensation in future.

INYO.
EMIGRANT.—Coso *Mining News*, Jan. 12: We learn from Mr. Peter Taylor, who came in from Lee district last Thursday, that the ice blockade has been raised and the mill is running as usual. Regular shipments of bullion will be made for some time, as, on his return he found a large amount of first-class ore on the dumps of the mine that had been extracted during his absence by his very efficient foreman, Mr. Gomer Jones. In fact, so much ore is now in sight that the labor of a number of men who were employed in exploration has been dispensed with, and the profits to accrue from reduction of ore on dumps and in sight will considerably exceed any run heretofore made.

NEW COSO.—Another assessment of 50 cents has been levied by the New Coso M. Co. This assessment, together with the amount of ore extracted and in sight, will probably place the mines of the company on a paying basis. There are about 1,500 tons of ore on the dumps, which are daily being added to, besides a large supply of coal and wood.

NEVADA.

THE SCARCITY OF WATER.—San Juan *Times*, Jan. 10: The ditches are all frozen up, and the miners are all idle. Nearly all the wells in town have given out, and the water companies that supply the town with Adam's ale are out of the article.

BLUE TENT.—Nevada *Gazette*, Jan. 12: The Blue Tent Gravel M. Co. commenced washing yesterday with about 500 inches of water. They need two or three times as much more to work their claims as they would like to.

THE SMITH MINE.—The quartz mine situated on Wood's ravine, known as the Smith mine, is as good a mine as there is in the country for the size of the ledge. They sunk an incline to the depth of about 40 feet, and struck a ledge four feet thick. It is very thickly sulphuretted and pays \$50 per ton, which is splendid paying rock. The only power they have is a hurdy-gurdy wheel, but they intend erecting machinery on the mine in a few months, which will

enable them to take out more rock. Only pocket ledges have been found on Wood's ravine, and no ledge would average the same amount to every ton as this ledge. Mr. Smith has been working on this ledge for the last six years, but has not had the luck to strike it so rich before. This will encourage many miners in that vicinity to work their mines.

ROCKY BAR.—Grass Valley *Union*, Jan. 15: The new company are running through their first crushing of rock of over 150 loads. A full clean-up has not been made, but the plates show splendidly in amalgam, and it is expected the result will be upwards of \$3,000, or \$50 per load. The company have let a contract to sink a new incline on the ledge, and the hoisting works on the Inkerman mine have been purchased and will be removed and erected over the new shaft. This work will be pushed as rapidly as circumstances will permit.

CENTENIAL.—The appearance of this mine has not been encouraging for months, as the ledge on the foot-wall was small and not very good. Superintendent Trenberth finally came to the conclusion that they were not running on the true ledge, and went into the hanging wall, when he found a 14-inch ledge that looks splendid. On Saturday, 18 car loads of this rock were taken out, which will yield \$30 to the car, or over \$100 to the load. The faces of Centennial shareholders were looking bright and jovial yesterday at this fortunate turn in the affairs of the mine, and their hopes were strong that the strike is to be one that will last. The Centennial has been a good little mine for the district; and although not remunerative to the stockholders (having declared but one dividend) it has, within the past 18 months, taken out and disbursed to miners and business men in Grass Valley over \$90,000. This has been from the product of the mine, without any assessment, and although the company has not always been encouraged with the outlook, they have persevered, and it looks now as if they were about to be rewarded for their pluck and persistence.

PLACER.

IOWA HILL.—Cor. Dutch Flat *Forum*, Jan. 10: At all points of our hydraulic section more than usual preparations have been made for washing, in anticipation of a wet season, and all claims are now in perfect readiness for the long and anxiously looked for rain; in fact, it is said preparations on so large and extensive a scale were never made before.

The most prominent item in mining is the blast at the Morning Star claim. I never before saw so much dirt thoroughly loosened up by three tons of powder.

DEKRUSE has run a somewhat long tunnel and tapped his pay dirt at another point, so that he can now run two pipes in winter and drift in summer. This advantage raises the claim to the first-class.

JONES & HODGES are opening some new ground at Bird's Flat, belonging to the former, with every prospect of good pay, and I hear a rumor that the great Sugar Loaf claim will certainly be put under the pipe if there is hereafter a prospect of three months' water. These are the only new things of the season in the hydraulic world.

The Enterprise has also made considerable improvements, and will now work to greater advantage than heretofore, both in the amount of dirt washed and the amount of gold saved.

GRIZZLY FLAT.—Stuart & Co. have gone into the old Vigilance ground, and are getting prospects as high as \$1.50 to the pan. Fred Hazelroth has also re-opened the old Cement Knob tunnel, connecting with the southern end of his own ground, and is getting fine prospects. Headline & Co., running in unexplored ground to the north, are carrying good prospects of fine gold, and expect to do much better when they reach the rim rock. Gus Hazelroth, after nearly two years hard work, is about breaking through into the old channel, and according to past evidences cannot fail to do well hereafter. Thus when we get the old Rough and Ready again in full blast by the Sunny South men, we have solid promises of good times next summer. In connection with the hydraulic mining, I ought to especially mention the Homan claim at Prospect hill. Great improvements to facilitate good work have been made here, and the claim to-day for its admirable fixing up has no superior in the district.

SIERRA.

WATER.—Mountain *Messenger*, Jan. 12: The Bald Mountain mine had about half a head of water on Tuesday. Very few men are now employed in the claim as the dumps are all full.

STRUCK GRAVEL.—The North Fork M. Co., of Forrest City, have at last struck gravel in their tunnel, and rich gravel, too, gold being visible to the naked eye in the dirt. The gravel comes in from the top of the tunnel, which is evidence that they are low enough this time.

FORREST CITY.—Our burg has been more quiet for the past two months than ever before since the Bald Mountain commenced taking out pay. Everything around the mines is full of dirt, and men are employed on the dumps scratching the dirt away from the rack to make room for a few more loads. The North Fork is, at last, in splendid looking gravel showing some gold, but their dump is full to overflowing with hedrock taken out in running their tunnel, and they will have to shut down soon if something does not turn up in the shape of water. The hotels are full of men waiting patiently for a chance to pay for the grub they are devouring, and the hotel-keepers are waiting as patiently

as they can for them to do so. The future of our part of the county looks very bright nevertheless, as almost every prospecting claim within five miles of this place has struck good pay. Before Bald Mountain gold gave an impetus to prospecting little could be done, while the present indications are that in a year at farthest we will have a dozen new mines paying dividends.

GOOD ROCK.—The men working in Ned Leonard's ledge, have struck some splendid rock, showing free gold. They are getting ready to take out ore for crushing. If our mines were owned at home, worked by white men, and the money taken out was employed in hunting for more mines, instead of being shipped to San Francisco for direct or indirect investment in stock gambling, the miners of California would be the most prosperous people in the world.

TRINITY.

QUARTZ MINES.—Peoples' *Cause*, Jan. 10: From H. E. Willey, an experienced and well-known miner of Lewiston, Trinity county, who has been superintending a hydraulic claim for the last seven years, and is now owner of two promising quartz claims, one in Trinity county, the other in Shasta county, we learn that the lively mining town of Lewiston has become somewhat famous from the finding of a number of rich quartz ledges. It is within the last two years only that this fortunate discovery has been thoroughly demonstrated. Many of the claims are now commencing to show handsome returns to their lucky possessors. Mr. Willey feels very sanguine as to the future of these northern bonanzas. Want of proper machinery as well as capital seems to be the only drawback which the fortunate locators have been contending with in the past. But lately these difficulties have been removed, and, in all probability, next summer, very rich returns will be the reward of the persevering citizens of Trinity county. Mr. Willey spoke encouragingly of the several new enterprises which are now being opened up in the vicinity of Lewiston.

TUOLUMNE.

OHIO MINE.—Union *Democrat*, Jan. 12: On Tuesday, the vertical shaft in the mine ran into a vein, a foot and a half wide, that pays \$30 to the ton. The supply of water having increased, the mill will be put in motion for crushing ore next week.

SNOW MELTING.—We learn that since the rain of Monday, the snow in the mountains has been rapidly melted, filling the ditches and reservoirs. Whether there is enough to do much good to the miners yet is doubtful. The melting of the snow this early in the season is not a very good showing for its continuance late into the dry season, and therefore not an extremely good outlook for the mining interests in the summer.

THEY ARE IN EARNEST.—The miners' league appear to have no disposition to limit their movement to mere words. We understand that several claims have been located in ranches known to contain mineral, which will probably be contested by the ranchers. These are to be used as test cases and every member of the league stands morally bound to assist the locators of these mining claims. It will be seen shortly whether the league has the power to enter patented lands or not. The plea relied upon is that the patents have been obtained through fraud and false swearing, thereby defrauding the United States. If this point be proven, there is no doubt that the agricultural patents will be revoked.

Nevada.

BRISTOL DISTRICT.

THE DAY MINE.—A visit to the Day mine, on Sunday, disclosed the fact that work is going on there pretty lively. Forty additional men have been placed to work; in fact, every idle man around Royal had a chance to work if he wished. The ledge from the discovery cut had been stripped on top a distance of 150 feet, and ore was being taken from the cut at a rapid rate. Teams were hauling away ore as fast as possible and there are thousands of tons there yet for them to haul.

MAYFLOWER.—The straightening of the incline has been completed and drift started north from the bottom. It is now 40 feet in good ore. Opposite to this, in the south side of the incline, a drift has been started south. It is in 12 feet. Average assay from face, \$147.63. In straightening the incline, some very rich chloride ore has been found in what was supposed previously to be the foot-wall.

CORNUCOPIA DISTRICT.

HUSSEY.—Virginia *Enterprise*, Jan. 15: The Hussey mine is a coming bonanza. From the 120-ft level to the 540-ft level there is a continuous ledge, 16 feet wide, of \$120 ore, and thousands of tons are exposed in the various levels, winzes and crosscuts.

SILVER QUEEN.—Cor. *Times-Review*, Jan. 12: A rich strike has been made in the Silver Queen, at a depth of 100 feet. The letter says further that the Mountain Laurel looks better and better and that the mines of Bull Run are full of promise.

ELY DISTRICT.

PIOCHE BULLION.—Pioche *Record*, Jan. 12: \$18,293.03 in bullion was shipped during the past week, according to reports of Superintendents.

TWENTY-STAMP MILL.—In consequence of the Day mine developing such an immense amount of ore in the discovery cut, the 20-stamp Ray-

mond & Ely mill will be started to work on it next week.

JUNCTION MINE.—Messrs. James & Hale are pushing work ahead on this mine vigorously; commenced sacking ore on Monday last; vein, two feet wide. This mine is the mine reported adversely upon by Prof. Price.

BAY STATE.—Contract has just been let to sink the incline 50 feet deeper. The late work in the bottom shows the vein to be wider and richer than above. Average assay from a width one and a half feet of the bottom gave \$219 per ton. The full size of the incline is in ore.

RAYMOND & ELY.—Still continue drifting in the winze, the water holding about the same.

GREAT EASTERN.—The shaft has been finished and the whim is being erected. The coming week expect to take out ore.

ALPS COMPANY.—This company shipped in the month of December, for 20 days' run, \$29,027 in bullion; also for week ending Friday, January 11th, \$9,055. Mill has been running on second-class and custom ore for past week, in order to allow the development on and below 11th level to be properly opened. The milling of first-class ore will be resumed on Monday.

The winze running down below 11th has been sunk 45 feet, in splendid ore all the way; work on it being pushed with eight-hour shifts. The Superintendent informs us that it will reach 12th level within 15 days, when drift will be started east to connect with west drift now being run from main shaft.

EUREKA DISTRICT.

MINING ITEMS.—Eureka *Sentinel*, Jan. 11: The average daily shipments of crude bullion amount to 80 tons.

EIGHT cars of crude hullion were shipped to Palisade yesterday.

CONSIDERABLE quantities of flue dust are being shipped to Sacramento, and more would go forward if the railroad company could furnish cars.

ONE hundred and seventy-two tons of ore from the Richmond mine yielded 48 tons of crude hullion, worth a trifle over \$300 a ton.

OVER 1,000 tons of lead are stacked up at the Richmond reduction works.

LOCKWOOD & REMINGTON yesterday shipped an additional load of mining tools to Danville district.

The Richmond company are not shipping either crude hullion or refined lead at present.

THE Connolly mine is turning out and shipping to the Richmond furnaces 10 tons of ore daily.

WORK is suspended at the Bald Eagle mine for the present, awaiting advices from New York.

MAJOR McCoy has struck a fine body of ore in his mine on McCoy hill, at the depth of 200 feet.

MESSRS. WALSH & TAYLOR will sink a shaft to the depth of 100 feet in the Admiral mine on McCoy hill.

THE average cost of extracting and smelting a ton of ore in Eureka district is from \$35 to \$38 per ton.

SURVEYOR WESCOATT has finished a glass model of the Eureka Con. and Richmond mines, for the use of the Richmond company. It is a *fac simile* of ore sent to London some two months ago.

LATE improvements in the method of charging the furnaces of the Richmond works has reduced the percentage of loss in the item of flue dust nearly one-third.

NUMEROUS cars, loaded with flue dust and bullion, are side-tracked in the depot yard.

THE K. K. Con. furnace will start up on the 25th instant. The repairs to it are nearly completed.

A RAILROAD team, loaded with 30,000 pounds of freight, left for Tyho this morning.

WORK is progressing finely at the Hoosac. Both sinking and drifting is going forward.

LEWIS DISTRICT.

EAGLE.—Reese *River Reveille*, Jan. 11: We have information to the effect that the Eagle Co.'s mill was started up at Lewis district on Monday last, and that the mill and the White furnace, recently added to it, are doing good work. The same authority states that Wells, Fargo & Co. have established an office at Lewis, with W. F. Mills as their agent.

MIAMI DISTRICT.

PROSPECTS.—Pioche *Record*, Jan. 12: S. R. Nichols, Recorder of Miami district, arrived in town, Thursday evening, and reports things in that locality as being in a very healthy condition indeed, the mines turning out beyond expectations and new and valuable discoveries are being continually made. Teams, loaded with 15 tons of ore, was to leave the mines for Pioche, Friday morning, and will probably arrive some time during Sunday. This ore is from the Lily May mine, and was simply taken out as a "grub stake." The miners anticipate a lively time at this district during the coming spring.

TUSCARORA DISTRICT.

THE MINES.—Virginia *Enterprise*, Jan. 10: Prof. W. Frank Stewart, who arrived here yesterday morning from Tuscarora, last evening showed us some very fine specimens of ore from the Grand Prize and other mines in the district named. From the Grand Prize he has a variety of specimens, from black sulphuret that will assay \$8,000 to \$15,000 up to wires of pure silver. From this one mine he has sulphuret of silver, ruby silver, pure horn silver, staphanite and native silver in flakes and wires.

This lead, which began as a mere streak at

the surface, is at the depth at present attained over eight feet in width, and its width is steadily increasing as it is followed down. It is a razor-blade ledge, and lies on its back. It is said that in sinking on it the assays for the first 30 feet were but \$3 or \$4 per ton.

The Professor has made a considerable number of locations in the district on very promising veins, but as yet has sunk on none of them to any great depth.

THERE are eight steam hoisting works in operation in the district, and the town presents quite a lively appearance. There will be great activity next spring as regards prospecting and all other mining operations. Prof. Stewart will leave here in a few days for San Francisco. He has great faith in the future prosperity of Tuscarora—says that outside of this place it is the best mining camp in the State.

HORNET.—*Times-Review*, Jan. 12: The Hornet company having arranged their financial complications will resume work at their mine either to-day or to-morrow. The work will be prosecuted with vigor, with four shifts of six hours each in the shaft. The Hornet has one of the best prospects in the district, and the resumption of operations by the company will doubtless prove a big lift to the town. Everything at the works is in good shape for a continuous run, with four months' fuel stacked on the ground.

GLAND PRIZE.—Sinking the main shaft, making over three feet a day. No water to bother. Drifting in lower level, and stoping between third and fourth and above the 150-ft level. Taking out about 45 tons of sulphuret and 20 tons of chloride ore per day. New shaft down 75 feet. Sinking continues at the rate of three feet per day. Very little water. The mills running at their utmost capacity. On hand at the mine and mills, 700 cords of wood, 1,600 tons of coal and 1,500 cords of sagebrush.

TYBO DISTRICT.

Two G.—*Cor. Tybo Sun*, Jan. 12: The Two G is furnishing more ore at present than the furnaces can get away with. Large quantities of ore are accumulating on the dumps and the indications about the mine all point to an inexhaustible ore supply.

WARD DISTRICT.

BULLION.—*Ward Reflector*, Jan. 10: On the authority of a man who ought to know, we will state that it is possible to turn out double as much bullion in the next 30 days as was shipped from Ward during the month of December, provided a sufficient amount of smelting ore of the character lately encountered in the Paymaster could be obtained. All of which is respectfully submitted.

On December 31st the Martin White company shipped 10 bars of bullion valued at over \$20,000—we did not learn the exact figures—making the fourth shipment for the month. The total bullion product for December is about \$84,000.

The furnaces were shut down on the night of December 31st in order to make needed repairs. Smelter No. 1 started up again on January 1st and No. 2 on the 2d. The cupels have since started up and everything is again in full blast.

Arizona.

HACKBERRY MILL.—From private advices we learn that work on the Hackberry mill, in Mohave county, is progressing vigorously. A part of the machinery is already in place. The battery frames and building are all under way. The mill is expected to be in running order by March 1st, and will be one of the most complete and effective mills in the Territory. Work on the mine is also being prosecuted vigorously, and it is showing well at all points. Important developments have been made in the lower levels, which add greatly to the value and permanency of the mine.

PLOMOSO.—*Arizona Sentinel*, Jan. 12: The Plomoso mining district, in this county, is now being prospected for silver, and is proving far richer than has ever been supposed. In the old days it was pretty thoroughly overhauled for placer gold, but at that time few miners knew anything about silver or could recognize its croppings when they saw them. From its being so close to settlements, later prospectors seem to have taken it for granted that there was nothing of value there, or that otherwise the ground would have been occupied. Tom Sherman and Bud Donaldson have struck two good galena and silver mines there, and located them as the Home Stake and Away Up.

PECK MILL.—*Arizona Times*, Jan. 5: The new Peck mill, it is expected, will start up in full blast within a week. She blew her whistle a few days ago. The Peck M. Co., of Arizona, has liquidated its indebtedness to the Bank of Arizona, \$27,000, for which certain stocks were hypothecated, the voting of which, at the meetings of the Directors, has been a matter of some dispute. This will change the stock in question into other hands, and no doubt, change the organization. We presume it will end in the disbanding of the Arizona Peck Co., and placing the whole management in the hands of the California incorporation.

BONDED.—J. R. Darroche, who has been five months in Humbug district, has come to town and signed a number of bonds, including the Oneida, Chenango, Huron, Maggie, Georgie, Naid Queen, and Rescue, which Charles Pletz took with him to California, with a view to organize capital to develop them. Darroche gives a good account of Humbug.

DRY WASHERS.—Valentine, the inventor and manufacturer of the Valentine dry washing machines, for the saving of the most minute parti-

cles of gold from the earth, shipped, this morning, by Mr. Wm. Underhill's team, three of these machines to Wickenburg, where they are to be placed in working order, and used on the poorer class of Vulture tailings, many thousand tons of which are piled up and waiting the advent of these machines, which are to separate the precious metal from the barren dirt. The richer tailings, of which there are large quantities, are being treated by pan process, with the most satisfactory results, and it is confidently believed by those who are competent to judge that these tailings contain over \$2,000,000 in gold, all, or nearly all, of which will be rescued and put into the pockets of the enterprising proprietors of the pan and dry-washer process.

HUMBURG.—The dump piles of the Tiptop are growing larger and greater day and night, and with rich ore.

The Madden claim, owned by Miles, Finlay & Co., is being worked, and turning out some rich rock. They have several tons of ore on the dump that will average \$5,000.

On the Red Bird the depth of shaft is about 25 feet, and although the rock is not as high grade as some, yet the ledge is of that width which makes it encouraging.

The claim called "Black Jack" is situated close to the Tiptop, and owned by Bostwick, Doherty & Co., and is very rich.

The Silver Palace, owned by Carpenter, Groll & Co., is increasing in width as they sink, and they have a quantity of the ore sacked, which, according to assay, goes to \$200.

JOHNNY BAYARD and Fred Plum are at work on the Legal Tender and Orbis. The assay on the latter is \$879.63.

Idaho.

ALTURAS CO. MINES.—*Cor. Idaho Avalanche*, Jan. 12: The Monarch company are working but five or six bands all told. Supt. Gaetz, of the Chicago Tunnel Co., is pushing work with satisfactory results, having completed the first 200 feet. It is splendid working ground, but very wet. Every 24 hours six feet of progress is made. This enterprise will have a great tendency towards developing the mines in Atlanta hill. During our holidays all mining operations were suspended, to start up again after New Year's. The Vishnu lessees have commenced to stoep out, and the Superintendent, Frank H. Rollins, is developing the Confederate and Golden Star mines, and has also started up the pumps of the Ada Ellmore mine to-day. The pumping gear connected with the mine is running like clock-work. Taking all things into consideration, our mining outlook is favorable.

BLACK JACK.—Reports from the Black Jack mine continue to be very favorable, and according to all accounts, the deeper they go the better it looks.

A LETTER from Mars Basin, Owyhee, of a recent date, says that some important mineral discoveries have been made within three miles of that place.

A FRIEND writing from Atlanta says that the Buffalo mill is running steadily and crushing ore at the rate of 10 tons a day, which yields about \$1,000.

SOUTH MOUNTAIN.—From a recent interview with Mr. W. W. Hastings, of South Mountain, we learn that the prospects of that camp are gradually brightening. He is running a tunnel into the Golden Monarch, and expects in a short time to tap a five-foot ledge, in which there is abundance of rock that will yield \$150 to the ton. There is a large quantity of good ore lying on the dumps in and around South Mountain which, if crushed, would yield somewhere in the vicinity of \$40,000, and it seems a misfortune that the furnaces cannot be used to make the reduction. The great obstacle in the progress of South Mountain has been Wm. M. Lent, and it is pleasing to know that he will stand in its pathway but a short time longer. All the old company's mines have been relocated and, with the furnaces and other property will, in a very short time pass into new hands. Mr. Lent himself admitted that South Mountain was a better camp than Eureka, and if his management had resulted in an honest and legitimate development of the mines around South Mountain, that camp to-day would be one of the most prosperous on the Pacific coast. As it is, the few men who have remained there are bound to make fortunes.

Oregon.

APPOINTED SUPERINTENDENT.—*Oregon Sentinel*, Jan. 9: J. S. Howard has been appointed Superintendent of the mines of Klippel, Hanna & Co., and will take charge in a few days. Mr. H. is an experienced mining engineer, and we congratulate the company on having secured his services. Work at these mines is progressing as well as can be expected, the only interference at present being the cold weather.

WEBFOOT.—Prof. J. M. Tiernan arrived in this place on Saturday last and left for Josephine county on the following Monday. He has severed connection with the Lucky Queen mine, and is now Superintendent of the Webfoot, in Josephine county, and was on his way to take charge when passing through this place. A recent assay of ore taken from this place proved it to be a valuable one.

Utah.

FRISCO DISTRICT.—*Cor. Salt Lake Tribune*, Jan. 9: Everything in this burg is progressing finely. The new smelters of Campbell, Cullen & Co., under the management of Mr. John D. Williams, are running splendidly. The Godhe & Co. smelter is also doing well and running better than ever. The Frisco reduction of Har-

ries, Fischer & Co. will send their first bar of fine bullion to Salt Lake City in one week from to-day. The bar will weigh about 80 pounds of fine silver. Wells, Fargo & Co.'s express office is to be established here with John M. Burke as agent. This is a want long felt. The Great Horn silver mine is looking huge. It is beyond the comprehension of any miner or expert at present. Another large body of horn silver ore has been struck in sinking, and the average assay is 300 ounces silver, and the Lord only knows how big it is. The heavy lead ores still continue to improve and grow richer.

British Columbia.

GOLD YIELD.—A. W. Vowell, Gold Commissioner of the Cassiar district, reports that the number of miners has not at any time during the past year exceeded 1,200, including 300 or 400 Chinamen, and the yield has been \$500,000, including \$173,000 from Thibert's creek, \$145,000 from McDamo's creek, and \$81,000 from Deare creek. The season was not favorable on account of numerous freshets. He thinks that Thibert's creek may double its yield next year. The Cariboo district produces about \$500,000 annually.

News in Brief.

MINISTER NOYES conveys to the United States the thanks of France for proposed participation in the Paris exposition.

HENRY M. STANLEY, the African explorer, has been presented with a gold medal, the gift of the late King Victor Emmanuel.

The Crispin troubles have extended to Marlboro', Mass., where several strikes began on Monday.

The average daily mortality from cholera at Mecca, to the 31st of December, was 60; at Jeddah, 38.

ALFRED E. EDGUMBE has been appointed by Congressman Luttrell as cadet to West Point. The young man is a resident of Vallejo.

SLADE the Spiritualist, has been expelled from Vienna, because he was unable to describe his avocation satisfactorily to the police.

The storm and heavy sea of Tuesday night badly damaged or destroyed the wharves at Carpinteria, Morro Landing, Ventura and Santa Barbara.

The exports from New York last week included 853,505 bushels of wheat, 218,442 bushels of corn, 6,624 bushels of oats and 77,892 bushels of barley.

SERGEANT CHARLES MCCARTHY, one of the recently released Fenian prisoners, who, with his companions reached Dublin Saturday, died suddenly on Monday.

The sloop-yacht *Clara*, having been purchased in New York by San Francisco parties, will be brought hither on the deck of the clipper ship *Young America*.

The railroad company has discharged about 300 Chinamen, they having completed their part of the grading on the railroad now building between Benicia and Suisun.

THREE hundred miles of railroad were constructed in this State last year, bringing the number of miles in operation up to figures exceeding 1,000.

On Saturday last, at San Rafael, a boy nine years old, while watching the operation of scalding a hog at the slaughter house, fell into a vat of boiling water. He died on Monday.

THE Courts have decided that the money for the compromise in the Lick trust matter, must come from the portions of the residuary legatees, viz., the Pioneers and Academy of Sciences.

GEORGE H. PENDLETON has been elected United States Senator from Ohio to succeed Stanley Matthews, the latter having been chosen to fill the unexpired term of John Sherman, Secretary of the Treasury.

The two most important Committees at work under Glover's resolution are: Whitthorne's Committee on the Navy Department and Glover's on the Treasury. The latter have evidence already that promises sensational developments.

THE Cousett (England) Iron Co., the largest makers of ship plates in the world, have blown out one of their blast furnaces, and the men employed at another furnace have received notice that their services will not be required at the end of a fortnight.

POSTMASTER-GENERAL KEY says business has so increased in the South that over 200 post-offices have been made presidential offices, namely: such as receive appointment from the President, and confirmation by the Senate. This indicates prosperity.

It has been resolved at a meeting of the Board of Directors of the Bank of California, to declare a dividend at the rate of seven per cent. per annum for the three months ending December 31st, payable on the 15th instant. No dividend has been paid by the bank since July, 1875.

SENATOR JONES still maintains that the President will sign Bland's silver bill if passed, and ridicules the idea that it will receive a veto. He refuses to believe the President will go against the silver sentiment of the West and allow his judgement to be influenced by hard-money members of the Cabinet.

LEUTENANT CLARK, who left New Red Cloud agency on the 7th instant, and New Spotted Tail on the 11th, says: "The Indians at hot agencies are well satisfied with the promises so far carried out, but they are anxious to move back from the Missouri river in the spring, and trouble is anticipated if they are not allowed to do so."

THEY have had a \$250,000 fire in Honolulu. THEY are having serious freshets in Virginia. HENRY M. STANLEY, the African explorer, is now in Rome.

THE amount of customs dues paid at this port last week was \$73,299.

A BABY show is the latest place of amusement in this city.

CASES of garroting still continue on the outside streets, in this city.

THE Roger bill for employing 2,000 men on the streets of this city, has been defeated.

A SEAMEN'S betel has been established at Portland, Oregon, the first in the State.

A CHINAMAN, arrested for murder last week, committed suicide in the city prison on Monday night.

CAPT. BOGARDUS, the shot gun expert, has succeeded in breaking 5,000 glass balls in 500 minutes.

THE winter is now severer in Turkey than that during which the Germans campaigned in France in 1870-71.

THE heaviest northeast gale ever known on the coast of Maine prevailed last week. A great amount of damage was done.

A SENATORIAL election will be held in Alameda county on the 23d, inst., to select a successor to the late Nathan Porter.

CHEYENNE business men are making overtures to have that place fixed as the starting-point of the Black Hills railroad.

THE Postoffice Department has issued orders to increase the mail services between San Rafael and Petaluma to three times a week.

JAMES R. KEENE says there is no truth in the California stories of his intention to return to San Francisco, for residence or business.

THE bark *Osmyn* was sunk by a collision with the bark *Aurcola*, near Port Townsend last week. Both vessels belonged to the same owner.

A FIRE broke out in the steamship *Herman*, while at sea, on Friday evening, which was with great difficulty subdued, after several hours' effort.

THERE are now 854 manufacturing establishments in San Francisco, whose aggregate products amount to \$62,333,000. They employ over 26,000 persons.

REV. HENRY WARD BEECHER offers to give up a quarter of his salary, in view of the falling off in pew rents. This will make his salary \$15,000 for the year.

H. L. TAYLOR & Co. struck a new well on Simon Well's farm, on the Ghost Well territory, Pa., which is flowing over 1,000 barrels. It opens up a large tract of new territory.

THE Immigration Society of Guatemala, founded under the auspices of and protected by the government, have sent an agent to San Francisco to endeavor to direct immigration to Guatemala.

A LONDON dispatch says that the Wigan cotton spinners have resolved, in consequence of the depression in the trade, to give all their operatives notice of a five per cent. reduction in wages.

At Lynn, Mass., on the 14th inst., most of the shoe operatives were requested by the employers to withdraw from the Crispin organization or quit work. The Crispins have adopted the latter alternative.

GENERAL SHERIDAN has been informed by the War Department of the ravages of Bannock Indians, who threaten a severe outbreak in Montana that will devastate ranches and destroy the lives of white people.

THE boring of the Channel tunnel between France and England is to be done by the French Railway company, the Chemin de Fer du Nord, and the Southeastern and Chatham Railway companies of England.

DEMETRIUS BULGARIS, the well-known Greek politician, has just died of apoplexy. He was President of the Provisional government of Athens in 1862, and later was President of the Council and Minister of the Interior.

W. S. DUVAL and W. T. Duncan, (son of Duncan, the Pioneer Savings bank defaulter,) have been arrested on charges of felony, as accessories to the escape of J. C. Duncan, by harboring and protecting him and not giving him up to the officers.

THE revolution in the northern Provinces of San Domingo continues. The insurgents surrounded Porta Plata, Santiago and La Vega. The whole mercantile community is in danger of being ruined. It appears that Ex-President Gomez is leading the revolution.

A STEAMER arrived at New Haven Saturday for a cargo of arms and ammunition for the Turkish government. Another steamer, laden with war material valued at \$1,500,000, has been in the sound the past 14 days, waiting orders to sail for Constantinople, drawing, in the meantime, \$250 per day demurrage.

SENATOR MCCORMICK has introduced a bill authorizing the Board of Supervisors of San Francisco to expend \$50,000 out of the General Fund for the improvement of Golden Gate and Bellevue parks, under the direction of the Commissioners, a part of which is to be used for the Lick observatory; also, \$25,000 for grading and improving the squares and plazas of the city, under the direction of the Superintendent of Streets; \$10,000 for cleaning sewers, under the direction of the Board of Health, and \$25,000 for cleaning the streets. The bill further provides that the Board of Supervisors shall fix by resolution the compensation of the men to be employed at a rate not exceeding \$2 per day, and that no man shall be employed who was not a resident of the city at the beginning of the year.

The Preservation of our Fisheries.

A subject which possesses present interest, both for its intrinsic worth and from the fact that it is up for legislative consideration, is the preservation and restocking of our California fisheries. That it is as advisable that our bays and streams should be made to yield their proportion of our food supply, as that a like area of our soil should be brought to its fullness of fertility, is admitted by all who are aware of the importance of the subject. To be convinced of this fact one has only to study the position which fish occupies in the food supply of the world and the achievements which have been made in intelligent fish culture during the last few years. We have no space for this inquiry at this time, although the facts are very interesting. Suffice it to remark that France years ago demonstrated that an acre of water may be made to yield from \$10 to \$50 per year by the cultivation of fish. We have no data for determining the possible result of making all available California waters thus productive, but Massachusetts, with more than 500,000 acres of ponds and rivers, is pushing forward most rapidly toward restoring these waters to their old-time fullness of fish production, thereby expecting to aid her citizens with at least \$5,000,000 per year in the value of fish taken from what a few years ago were almost waste waters. This is at least worthy of the careful consideration of Californians, both to strengthen their favor of the operations which are now being prosecuted by the State through our Fish Commissioners, and to induce them to stock the ponds and streams which lie within their own fences.

We have been much interested in reading the straightforward and practical report lately made to the Governor by our Fish Commissioners, Messrs. Redding, Throckmorton and Farwell. They have evidently been diligent in the prosecution of their gratuitous labors and they deserve the thanks of all. Their report contains many points of general interest and information and other points of which bring forcible support to the maintenance of our legal provisions for the preservation of our fish during the spawning season. We shall instance chiefly the former at this time; leaving the latter until we know that the preservation measures are definitely assailed.

Of the reduction of the salmon supply which has been caused in this State the report says: "In 1850 the salmon resorted in vast numbers to the Feather, Yuba, American, Mokelumne and Tuolumne rivers for purposes of spawning, and many places, such as Salmon Falls, on the American, were named from the abundance of these fish. On the Yuba river, as late as 1853, the miners obtained a large supply of food from this source. At the present time no salmon enter these streams. It would be safe to estimate that one-half the streams in this State to which salmon formerly resorted for spawning, have, for this purpose, been destroyed by mining. As mining is the most important industry, of course, for this evil there is no remedy, other than by artificial means to increase the supply in those tributaries that are still the resort of these fish. * * *

"The introduction of more than 8,000,000 young salmon into the headwaters of the Sacramento, since the organization of the Commission, in addition to the natural increase, has had the effect to keep up the supply and reduce the local market price of these fish. It is reported that the 'cannery' at Collinsville has purchased all the salmon it could consume during the past season at from 25 to 40 cents each.

Of the actual increase in the catch of salmon in the Sacramento and San Joaquin rivers, the Commissioners make the following statement: "In our last report we showed the total weight as transported from the leading places of shipment to San Francisco from November 1st, 1874, to August 1st, 1875, to be 5,098,781 pounds. This year's tables show the catch from November 1st, 1875, to August 1st, 1876, to be 5,311,423 pounds, and from November 1st, 1876, to August 1st, 1877, 6,493,563 pounds. This shows a gain of more than 1,000,000 pounds in the legal catch over any year since the organization of the Commission, and may be ascribed to the fact that our waters are now beginning to feel the beneficial effects of the millions of salmon hatched artificially and turned into the headwaters."

The report aside from the points in favor of the close season for salmon, makes specific mention of the wrongs which are being practiced upon our fisheries. One point is as follows: "The Chinese and others continue to use nets of a mesh much finer than is allowed by law, and the young of all kind of salt water fish that spawn in the bays and estuaries, are persistently caught, dried and shipped to China. The records of the Custom House show that there were shipped to China, from San Francisco, during the year ending July 1st, 1877, dried fish and dried shell fish valued at \$293,971."

Although the labors of the Commission are mainly expended in the preservation and increase of our noble fish, the salmon, due enterprise is shown in introducing valuable fish from foreign waters. The reports mention the shad, which are now becoming quite numerous in the Sacramento river, and the catfish, which are

now becoming quite an addition to the fish supply of the State capital. They have also implanted in California waters, white fish from the East; carp from Japan and the Danube; "awa," the most valuable fish of the Sandwich Islands; and mullet from the same waters; trout, black bass, eels and lobsters from the Eastern States. All these have been put in appropriate waters in different parts of the State, and already there is evidence that they are thriving and multiplying. The results from all the enterprising movements of the Commission will ere long prove the wisdom of the State in taking steps for making its waters more and more productive of valuable food for the people.

California Climate and Consumption.

Indiscriminate praise is productive of evil. It cannot be doubted that our favorite State has suffered more from flatterers than defamers. Glowing statements with either thoughtless or studied neglect of qualifying conditions are quite apt to mislead, and those who place reliance upon them often reap disappointment. Those who have glorified our conditions as favorable to industrial success have many times forgotten to state that labor is requisite to success here as elsewhere. The result has been that hundreds of thoughtless persons have come to California expecting to gain a livelihood and a competence simply for the asking. Failing, of course, to receive it upon such conditions, they have become bitter denunciators, blaming the State for the failures which their own weak hearts and unwilling hands achieved. Not otherwise has been the praise of the climate of California in its relations to consumption. Glorious as we find our clear and invigorating air and warm sunshine, we have been too apt to speak of it as the sovereign cure for all the ills to which flesh is heir. Especially in its favoring influence upon those afflicted with consumption has our climate been lauded high. This general praise has been productive of evil in many cases because it has been spoken without discrimination. We have forgotten that we have a complex climate, and therefore discrimination is most necessary. We have also forgotten that consumption is a disease capable of division into degrees, and in its later stages seems to pass almost wholly beyond the reach of climatic influences. For these reasons there seems occasion to conclude that in some cases California climate, in its relation to consumption, has been praised not wisely but too well. We are glad to see that this subject is being considered by competent and discriminating minds, and that the true opportunity which our State affords to unfortunate victims of lung diseases, bids fair to receive true exposition.

One of the most interesting papers in the valuable report which our State Board of Health has just handed to the Governor, is upon the subject which we have mentioned, and is by Dr. F. W. Hatch, of Sacramento, the permanent Secretary. For the information of our readers, both here and at the East, we propose to present, as briefly as possible, the leading points brought forward by Dr. Hatch. For practical purposes he divides the State into four regions, more or less distinct, in respect of climate. First, the coast and the valleys bordering thereon; second, the interior valleys, as the Sacramento and San Joaquin; third, the Coast range mountains; fourth, the Sierra Nevada mountains. These divisions are also subdivided in the report.

Beginning with the climate of the coast and the coast valleys, Dr. Hatch starts at San Francisco with a mean annual temperature of 55.23° Fah., and follows the coast to San Diego with a mean temperature of 62.11° Fah., including a narrow belt of country extending along the coast for a distance of 479 miles. The climate of this extensive district presents certain features in common though varying in degree—a winter season mild and agreeable, a certain amount of fog, and cool wet winds in the summer. Taking San Francisco as an extreme, we find some modifications in each of these extremes as we go southward. The number of foggy days may be said, as a rule, to become less, the severity of the summer winds is subdued, the temperature somewhat higher and more equable, the rainy season shorter and the rainfall less abundant, and intervening between these two seasons of summer and winter, a short season representing spring, which becomes more and more attractive, inviting by the mildness of its temperature, the purity of its atmosphere, the early freshness and beauty of the vegetation, and combining all these qualities which have given to this region its popular reputation as a resort for health. Dr. Hatch then proceeds to analyze the different localities along the southern coast, and adduces the testimony of local physicians as to their fitness and unfitness for consumptive people, and the months in the year when these qualities are most predominant. We have no space to follow these interesting inquiries, but the result will appear in the general conclusions which we shall present before we close.

Of the climate of the great central valleys, the Sacramento and San Joaquin, an extensive district, stretching from the 35th to the 41st parallel, with an average width of 50 or 60 miles, it is said: The meteorology of this vast

region presents certain features common to every part. As compared with the coast region, the atmosphere may be said, in a general way, to be warmer and drier during the summer, not much subject to fogs, a high temperature during the day, with a considerable reduction at night. Although giving this region of our State full credit for its many charms and excellencies, Dr. Hatch concludes that "in the prolonged high temperature, the sudden changes which occur in places subject to the influence of the ocean winds (which sweep through the Straits of Carquinez and diverge north and south), the comparatively greater humidity of the atmosphere, and the presence of malaria, is found a combination of circumstances which would seem to render this interior valley region ineligible as a summer residence for the consumptive."

Concerning our mountain climate, both of the Coast range and the Sierra Nevada, Dr. Hatch speaks at length and with definiteness. We have space only for his general comparisons. As compared with the great valleys, the mountain climates, as a whole, possess a less prolonged season of high temperature, a lower relative humidity; comparative exemption from malarial influences; altitude and its supposed advantages in chronic pulmonary disorders. As compared with the coast region, the mountain climates have a lower relative humidity; a greater exemption from winds and fogs; the advantages of altitude and a more invigorating atmosphere. These points of comparison refer to climates in the different regions during the summer months.

After treating his subject in all its parts scientifically, so far as data afford ground for a scientific deduction, Dr. Hatch concludes with the following general observations:

First—That for the majority of invalids seeking a change of climate in consumption, the mountains—preferably the Coast range—offer advantages, during the summer and early fall months, superior to those of any other portion of the State.

Second—That a certain proportion may find the eastern slope of the Coast range agreeable and beneficial even during the winter season.

Third—That a life in the open air—camp life, with the exercise to which it invites, agreeable companionship, pleasant occupation of mind and body, are indispensable to the attainment of the full benefits to be derived from climate.

Fourth—That for a large proportion of consumptives, some point on the southern coast seems eminently suitable as a winter residence.

Fifth—That the premonitory stage of phthisis, or the first stage of its actual development, are the only ones in which climate may be safely relied upon. That some cases in the second stage may be greatly benefited, especially when the nutritive processes are not seriously impaired. That a few may secure an apparently permanent arrest of disease, and enjoy good health for many years; but that the climate of California, while it may for a time seem to inspire hope offers, in reality, no very strong inducement to these lapsing, or who have already passed, into the third stage of disease.

Sixth—That the remedy, if found beneficial, must be continued from year to year, until the restoration of the nutritive processes is complete, and the progress of disease, as determined by the physical signs, appears to be arrested.

Work for the Unemployed.

The problem which is now forced upon public attention by the threats and demands of incendiary leaders is one which should be quickly brought to solution. Although we have no sympathy nor tolerance for the riotous incitements of those who have constituted themselves leaders of the unemployed, it cannot be doubted that in the rank and file of those who follow this unfortunate leadership there is real hardship and an honest desire for assistance. In our view of the matter, the way to meet this condition is to disarm the movement of the only element of strength there is in it, and that is by providing work for the unemployed at a price which will sustain life. If there were no material in the form of men without employment, the fabric of riot, which a few men are striving to weave for their own aggrandizement, would fall to the ground by its own weight, and the weavers would be regarded as too harmless and worthless even to lumber up a prison.

In the first place, the State and municipal governments, in their beneficent character as conservators of the public well being, could, we think, find fitting opportunity for the exercise of their paternal functions in providing a means of earning bread to those who are kept from it by the exigencies of the times, and not by their own fault or choice. There are public works which can be wisely undertaken, and which can never be more cheaply executed than now. There is wealth enough in the country to defray the expense with no hardship, for the chief burden will come on those who have most, and whose money now lies idle in the banks because of the slight demand for it. There is prospect enough in the future of the city and State to warrant the inception of wise and permanent improvements now for the coming generation to pay for, and capital is said to be ready to entrust itself for future returns.

Second, it seems evident to us that the cheapest way by which the public can release itself from dangers which now threaten destruction

of life and property, is in disarming the malcontents by providing for them, rather than by allowing them to pursue the present evil tendencies until they eventuate in riot and crime. Prevention is proverbially better than cure. It would be far cheaper to build a boulevard than to fill our streets with armed militia. The desert wastes of Golden Gate park can be made to blossom like a rose for less money than the city would lose by a riot and by the prosecution and execution of the offenders. No one doubts but than uprising like that we bear so freely threatened would be quickly and permanently crushed if it should assert itself; but who thinks it is the dictate either of economy or humanity that the city should wait to have its streets raked by grapeshot and perhaps its proudest buildings in ashes? We have, of course, no belief in the accomplishment of the revolutions which agitators urge upon their ignorant and thoughtless followers, but there is reason to fear that they may inflame desperate men to deeds which may lead to the destruction of a part of the city and their own. This is what we believe can be prevented for far less money than it could be cured, if the disease is permitted to break out. For this reason we are in favor of the request which the city is making this week upon the Legislature for permission to raise money on its own security for the prosecution of certain beneficial public works. If the city can thus offer a livelihood during the winter to those who will labor for it, the present movement of the unemployed will be shorn of all the strength there is in it, and those who are now endeavoring to profit by men's misfortunes will be forced to seek more honorable employment.

It is claimed by those who object to the city's offering employment to all who need bread, that the announcement of the city's action would bring thousands of unemployed from the country, and the city would thus be forced to bear the burden of the whole State. This would probably be true to a certain degree, and it might be advisable for the State to undertake some needed public work in the interior. It might be found that the West Side canal project was ripe enough to push forward into actual building, and this would give employment to an army of men. This too could now be constructed cheaply if the funds were honestly administered, because men could be had at little more than the cost of living. It would be, of course, unwise to begin a work of this kind hurriedly, but we take it that the canal has been virtually decided upon in some form and the Legislature might safely order that the preliminaries be accelerated with all proper speed and the work begun. This project would have to be fostered by the State, although the benefited lands should ultimately fully assume the burden. Thus it might be found that the State could most cheaply provide for its unfortunate wards and relieve communities from the sustenance and plundering of the horde of tramps which now besiege our farm and village homes. The whole State would be interested in this result. As it is the burden of supporting tramps falls most upon those who can least afford it. If the State had work for them and should direct them to assume it or go to prison, many a resident of the interior would breathe more freely and sleep more soundly.

The beginning of the West Side canal this season, should it be found practical, might give work to those who may need it none the less, although they are good citizens and not tramps, nor "revolutionists." Should this year prove dry as the last, a contingency which seems quite possible, at least so far as the San Joaquin valley is concerned, there would be a need among many dwellers in that district of opportunity to employ their hands and teams. It has been shown by experience in the valley that the farmers build the best irrigation ditches, and it would be a boon to many to find employment on a public work which their own fields denied. For this reason, as well as for giving livelihood to the country's "unemployed," it would be a public benefit to have this work begun and prosecuted with vigor.

The view which residents along the line of the canal and elsewhere take concerning its building is to be learned even more fully during the coming week, as the Senate committee on irrigation has resolved to hold meetings at different parts of the State, as may be seen by an article in another column. We trust that something may be found feasible, both in city and country, by which work can be afforded to all who honestly need and desire it, and then "agitators" and "revolutionists" will find themselves without an avocation.

THE Victoria Colonist of a late date has the following: On two streams that empty into the Alhemi canal, about six miles from the mill site, some 35 Chinamen are engaged in gold-mining, and it is said that they average nearly \$1.50 per day, a rate of pay sufficient to satisfy John's yearnings for sudden wealth. The gold is found in the beds and banks of the streams.

THE Conley & Gowell Consolidated mining company has recovered judgment in the Fifteenth District Court against the Excelsior Gravel mining company for foreclosure of two mortgages and \$6,648.

THE Mexican Congress has voted to admit breadstuffs from other countries free of duty, which will be very advantageous for California, New Mexico and Texas, furnishing an available and profitable market for their produce.

A NUGGET weighing 26 ounces was taken from a placer claim at Oescenia on January 7th.

Continued from page 34.

which runs from the main shaft south 225 feet, on the west side of the ore body, and thence east to the Gould & Curry drift. This drift has secured for us good ventilation, and the south ore-breasts can again be reached.

The 1650-Foot Level

The drift which starts from the Consolidated and California joint shaft on this level has been carried forward to the ore vein. The sill-floor of the ore vein on this level has been opened the full width of the vein for the distance of 200 feet from the northern boundary of the mine to the south. The upper, or 13th floor of this level is worked only 100 feet south of the north boundary line—as by our system of working, each floor below is kept in advance of the floors above. A large quantity of valuable ore remains in place on this level. The ore in the face, going south, continues of good quality, and maintains its original width.

1750-Foot Level.

This level has been opened by running a large drift from the Con. Virginia and California joint shaft to the ore vein, 650 feet. The ore body on this level has been developed by running a drift the whole length of the mine connecting with the Best & Belcher drifts and with the Gould & Curry shaft on the south; also by three winzes connected with the 1650-foot level. A joint drift has also been run across the ore body near our northern line from the east clay wall to the west clay wall. Crosscuts numbered two and three, nearly 100 feet apart, have been run across the vein from wall to wall. The vein retains its width and in this respect it is equal to, if not greater than that on the level above, and it is more regular and has better defined clay boundaries and walls. There is some good ore on this level, but the greatest portion of the ore, so far as it has been exposed at the present stage of the opening of the level, is of a low grade. The good ore is confined to the east wall, and so far as it has been developed is 28 feet wide in the widest place.

Subsidiary Work.

The foregoing is a summary of the chief points of interest pertaining to the operations on the several ore yielding levels of the mine. In addition to the operations detailed above, a vast amount of subsidiary work has been done during the year, such as keeping in condition the shaft and etations, maintaining lateral drifts, opening and keeping open air connections, etc. This necessary dead work entails an expenso of at least \$20,000 monthly, and a large portion of this expense accrues from the necessity of keeping up ventilation in a temperature which ranges from 85° to 110°. In working these wide bodies of ore the pressure of the ground around the worked stopes is so great that it requires a large force of men to keep the mine in a working condition. Furthermore, to work these wide bodies successfully, the ore must be extracted rapidly to avoid caving of the ground and the crushing of timbers, by which a large amount of ore would be lost. This rapid extraction of ore calls for a corresponding increase of work, which swells the mining expense for the time being, but is economy in the end.

The main shaft has been sunk from the 1550-foot level, and connected with the drifts in the ore vein on the latter level. Four hundred feet of it has been retimbered and some parts of it three or four times. It is passable, but not in good order. In the coming year hoisting must be discontinued for two or three months as the shaft is badly crushed and dangerous, and requires extensive retimbering. The various lateral drifts on the several levels, also need retimbering. It is very difficult and expensive to make these repairs while ore is being extracted, and I therefore recommend that at some time in the ensuing year, the work of hoisting ore through the old main shaft be suspended for a sufficient time to make these repairs.

The Monthly Dividends.

There is a great deal of ore yet in the mine for dividends. How much, it is impossible to estimate with any accuracy. But until we make further explorations below the 1750-foot level, and complete the necessary repairs spoken of, I would further recommend a reduction of the monthly dividend.

The Con. Virginia and California joint shaft has been sunk from 25 feet below the 1650-foot level to a point which is 12 feet below the 1850-foot level; and the timbers for a shaft station at the latter level are already in place. The heavy flow of water has continued throughout the year, and remains unabated. This heavy flow of water, amounting from 43 to 45 miner's inches, all comes into the shaft at a point 37 feet above the bottom of it, with the exception of about 10 inches that issues from the C. & C. drift on the 1500-foot level. The bottom of the shaft is now dry and in very hard blasting rock.

Each hoisting compartment of this shaft is fitted with three cages, one over the other, which enables us to hoist three tons each trip in each compartment. A fourth cage is in readiness to be added to each compartment whenever required. Two of the cages are loaded at the same time, and they are also unloaded simultaneously.

All the appurtenances to this shaft, such as the main building, the ore house, the hoisting and pumping machinery, the pumps, pump bohs, water tanks, etc., have not deteriorated in condition since my last annual report, but have rather been made more complete by such additions and changes as circumstances re-

quired, one of which is a large new air compressor, which has been constructed on a scale and in a manner commensurate with the large future requirements of the two mines. A branch track from the Virginia and Truckee railroad passes on two sides of the works, in close proximity to them, and this enables us, in the most convenient and expeditious manner, to land wood, timber and other mine supplies, and to ship to mill the ore which is raised through this shaft.

Our assay department, which has been in operation for nearly two years, has fulfilled our highest expectations as to its capacity for work and economy in expense. In it has been melted and assayed, during the past year, all the hullion which has been produced from this mine and the California mine; and in the same time 40,484 assays of ore samples have been made for both mines.

In connection with this report you will find supplementary statements carefully prepared by Mr. Taylor, Chief Clerk, showing interesting facts in relation to the production of the mine. These statements are submitted for critical examination as a full and accurate exhibit of all that pertains to the expense of working the mine, such as the amount of labor employed, its divisions and cost; the nature and cost of all materials used; the cost of reduction of the ore, and the character and amounts of various other expenditures which are always incident to our mining operations. Yours, respectfully,

JAMES G. FAIR, Supt.

USEFUL INFORMATION.

Smoked Goose and Duck.

We do not know how practical the following suggestion may be, but there is interest in it certainly. Mr. W. M. Ryer writes to the *Bulletin* as follows: On the continent of Europe smoked geese and other wild birds are to be found in the provision stores, and are sold at prices considerably higher than ordinary meats, being considered delicacies. The breast or liver of a goose, when smoked, is a choice morsel for an epicure, and the whole bird is at all times desirable as a change in the ordinary routine of the dinner table. You are aware that in the mountains of California and Nevada among the miners, and upon the plains among the farmers, fresh meat cannot always be had, except in or near the towns. From this both miners and farmers become consumers of salt and smoked meats, as well as canned meats and fruits. To these, smoked birds might advantageously be added. Smoked fish, such as herring, mackerel, salmon, etc., and smoked pork, in the form of bacon, ham, etc., and smoked beef and venison are all excellent articles for food, and why not smoked geese and ducks?

Some may suppose that at the price wild birds sell for in San Francisco, it would not be possible to get them in quantities sufficient for smoking. This is a mistake, for the birds are more abundant than the salmon in the rivers, and there are plenty of men to hunt them, provided they could dispose of them near their hunting grounds. Hunting grounds for ducks and geese are rarely near town, railroad depots or steamboat landings. The hunter of one day spends the second in getting his game on the cars; the third day finds his game in the hands of a commission merchant or middleman; the fourth day one-half or more is spoiled or is not sold, and the return made to the hunter is discouraging. Before the canneries were established only enough salmon were caught to supply immediate wants. Now fishing is largely for export trade. Smoking establishments are not necessarily expensive, nor do they require much capital to conduct them. Every slough, river, lake, and all the overflowed land abound in edible birds. If a hunter could send every day to such smoke-houses or curing establishments the game he shoots, he would have a profitable occupation, and probably 2,000 men who are now idle could thus find a means of living. As it is now, a hunter may drop fifty geese or ducks in a day, and find no available market for them, but if canning establishments were near his hunting place he could make satisfactory wages.

PERU AND THE CHINAMEN.—While Californians are trying to get rid of John Chinaman, the Peruvians are making unusual efforts to induce him to come and work on their sugar plantations. The government of Peru has granted a subsidy of \$120,000 to a company which proposes to establish a line of steamers between Callao and Hong Kong, and an agent has arrived in San Francisco to engage Chinamen to embark for Peru, where there are promised the "freedom of the country" and a "soft" dollar (about 80 cents) a day for work on the sugar plantations.

THE WORLD'S WINE PRODUCTION.—An official statement gives the number of gallons of wine produced by each of the grape-producing countries of the world for 1876: France, 1,176,076,119; Germany, 76,317,204; Switzerland, 30,000,000; Bohemia, 85,000; Austria, 84,802,841; Hungary, 221,214,400; Russia (provinces in part), 44,361,000; Portugal, 111,000,000; Turkey and Roumania, 22,000,000; Australia, 1,928,624; Cape of Good Hope, 1,785,926; Balearic and Canary Isles, 291,456; Spain (in part), 66,000,000; Greece, 26,400,000; United States 14,000,000.

A Really Indelible Ink.

The ordinary so-called "indelible" inks are prepared from salts of silver, and the writing done with them can be removed by soaking the linen with a solution of cyanide of potassium (exceedingly poisonous, it should be remembered), or of hyposulphite of soda, or by moistening with a solution of bichloride of copper, and then washing with aqua ammonia. A really indelible ink, that is one that cannot be removed by chemical agents, says the *Journal of Chemistry*, may be made from aniline dyes according to the following recipe:

Dissolve 8½ grs. of bichloride of copper in 30 grs. of distilled water, then add 10 grs. of common salt and 2½ grs. of aqua ammonia. A separate solution is made of 30 grs. of hydrochlorate of aniline in 20 grs. of distilled water, which is then added to 20 grs. of a solution of gum-arabic, containing 2 parts of water, 1 part of gum-arabic, and, lastly 10 grs. of glycerine. Four parts of the aniline solution thus prepared are mixed with part of the copper solution.

The fluid thus prepared has a greenish color, but becomes black in a few days after being used for marking, or at once by the application of a hot iron, or on being otherwise heated. A steel pen may be used for writing with it. If the cloth, after being marked, is put into tepid soap-suds, the writing acquires a fine bluish tint.

The ink should be perfectly limpid, so as to penetrate the fabric, and the solutions should be mixed only when they are to be used.

ACTION OF PARAFFINE OILS ON METALS.—Dr. Stevenson Macadam read lately an important paper on paraffine oils and their action on metals before the North British Branch of the Pharmaceutical Society. In the course of a lengthened series of experimental observations on various paraffine oils, attention was directed to a certain oil which burned somewhat imperfectly in different lamps. It was feared that this oil was contaminated largely with lead compounds, which choked up the wick and ultimately diminished its capillary attraction so much that the light was extinguished. In a single night the wick of the lamp had to be changed several times, and the wick, when charred, left a fine network of lead. The oil had been stored in a tank lined with lead, and dissolved so much of the lead that its value as a luminant was destroyed. The action of the oil on tin, copper and iron was so slight that its luminant properties were not much diminished. Zinc, however, was much affected, as the oil was consequently rendered nearly as useless for illuminating purposes by it as by lead. Dr. Macadam, therefore, suggests that, while the vessels for the retention of paraffine oil may be safely constructed of or lined with tin, copper or iron, it would be preferable to use cisterns lined with enamel for storing the oil.

GOOD HEALTH.

Causes of Diphtheria.

In a paper read before the Syracuse Medical Society, and printed in the *Journal of Chemistry*, E. R. Maxson M. D., L. L. D., instances the following conditions as conducive to diphtheria: In this as in all putrid fevers every imprudence and deviation from the laws of health, such as exposure, want, improper clothing, unwholesome and improper food, low, damp apartments, filth of every kind, including animal and vegetable, act as predisposing causes.

A damp atmosphere, such as always exists in some localities, from protracted rains, or from warm weather at seasons when it is usually cool, there being little ozone generated to purify the air, may also predispose to this disease. It acts, doubtless, not only by causing to be retained in the blood the perspirable matter, but also by letting down the positive electrical condition, depressing vitality, thus rendering the brain incompetent to generate and distribute sufficient vital force to keep up a perfectly healthy condition of the system. The generation of ozone during thunder storms in summer, purifying the air, lessens the liability to this disease.

On the temperate, well-fed, properly clothed, and cleanly, whose blood may be up to the standard of health, such atmospheric and electrical influences may scarcely operate unfavorably. Not so, however, with the unfortunate children of want, who are half fed, improperly clothed, and filthy withal. Nor with the imtemperate nor imprudent, not with the gaudily-dressed, bare-armed and bare-legged children of wealth and vanity, equally unfortunate, their parents not having the discretion to protect a child as they would a brute.

It is probable, however, that in every case of diphtheria there is an animal poison introduced into the blood, either from the bodies of those suffering from the disease, or else arising from an accumulation, and perhaps decomposition, of various animal secretions and exhalations. It is also probable that the paludal poison is generally combined with the animal, in a greater or less degree; often in sufficient quantity to render the disease slightly remittent, and increasing its malignancy.

It appears that the animal and paludal poisons combined, or else the contagion, when it is thus contracted, may early enter the blood through the skin, stomach, or lungs, decomposing the fluid; and hence the putrid odor, and the fibrino-albuminous exudation, prostration, chills,

fever, and every essential feature of the disease; the animal miasm decomposing, or producing fermentation, while the paludal depresses the nervous system, causing the remittent tendency. The contagion, when it is the cause, produces a similar change in both respects; such cases being, perhaps, less remittent, especially in districts that are but slightly if at all malarious.

Among the sources of the poisons causing diphtheria, the most frequent are doubtless personal filth, dirty, damp apartments, imperfect sink-drains, privies, filthy water, pig-sties, hen-coops, and piles of decomposing animal and vegetable matters.

Adulteration of Tobacco.

Tobacco, as even its users know, says the *Boston Commercial Bulletin*, is notoriously adulterated, and so skillful are those who perpetrate these frauds, that it is almost impossible to detect the imitations of the choice brands. With the cheaper grades, where less care is taken, it of course is different. Of the vegetable substances used there are leaves of the dock plant, rhubarb, coltsfoot, cabbage endive, chicory, elm, oak, etc. In addition there are immense quantities of decayed moss and sea-weed used, with oakum, brown paper, logwood, and various other articles, most of them innocent of harm. The saccharine substances, such as beet-root, licorice, molasses, dregs, etc., are also nameless. But when we consider the article employed to give taste and pungency to the fraudulent combinations, it is at once seen what risks confirmed tobacco users run. To flavor these hogs manufactures, oxide of iron, chromate of potash, chromate of lead, umber and Spanish brown are used. Of all the preparations of tobacco, snuff is that whose use is attended with the most danger. It would be difficult to find a specimen of snuff which does not contain the oxide above mentioned, together with ealt, cayenne pepper, and very often finely powdered silica and glass.

ADAPT YOUR SHOES TO YOUR FEET.—Why it should be desirable to have a small, weak foot any more than a small and weak brain is not easy to conceive. For the purpose of having such small feet, not a few wear hoots one or two sizes too small, and about two-thirds of the width of the foot, as it would be at the ball if allowed to spread as it does when standing without the confinement of the hoot. As a natural and necessary result of such pinching confinement, the foot becomes deformed and larger than it would naturally grow, with enlarged joints, the toes turned from a line parallel with the foot, to say nothing of the troublesome corns so annoying and crippling to a large class of young women. The worst results of this crippling custom of wearing small and narrow boots is felt by children when allowed to outgrow their boots. It is poor economy to allow the young to wear hoots when the feet have become too large for them, since deformity of the feet is easily produced at this time. When the boot is too short for the wearer, and the heel too high, the ingrowing of the nails is a perfectly natural result.

SCARLET FEVER.—Rules for the prevention of scarlet fever have lately been issued by the Michigan Board of Health, and as this is one of the most contagious of diseases, it might be well to bear them in mind. The first precaution is the isolation of the sick from the well and the prevention of contact with the patient. The room should be cleared from all unnecessary clothing, carpets or other substances in which the poison may lurk and be thence transferred elsewhere. The patient should use rags instead of handkerchiefs, so that they may be burned. Body and bed linen should be placed in vessels of water containing chloride of lime or similar substance. Discharges should be received in a solution of sulphate of iron or copper and be afterward buried. Persons recovering from this disease should be considered dangerous as long as there is any scaling of the skin, soreness of the eyes, etc. Many other precautions are inculcated, all of which are considered more or less important.

ANOTHER CASE OF ANILINE POISONING.—The fact has recently come to light in Germany that poisoned aniline dye is sometimes used to color the lining of hats. A hat with a brown leather lining was purchased at Stettin, near the Baltic sea, by a gentleman, who began to suffer from inflammation of the head and eyes soon after he commenced wearing it. A chemical examination of the hat showed that the brown hue was imparted to the leather lining by means of a poisonous substance intermixed with the aniline dye made from coal tar, and the illness of the wearer was occasioned by the contact of the poison with his head.

THE CORSET LIVER.—Some medical students in one of the Cincinnati colleges, dissecting a female subject a few days ago, found what is called in doctor's parlance a "corset liver." When tight lacing has been practiced through several years, a permanent dent or hollow is produced in the liver, which may be seen very plainly after the woman is dead and her liver taken out. This kind of liver occurs so frequently in woman that physicians have given it the name of "corset liver." In the subject mentioned, the hollow in the liver was large enough for the wrist of a grown man to be laid in it.

MINING SCIENTIFIC PRESS.

W. B. EWER, SENIOR EDITOR.

A. T. DEWEY, W. B. EWER.

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SAN FRANCISCO:

Saturday Morning, Jan. 19, 1878.

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The Week.

The week has been characterized, happily, by the heaviest storm and rainfall of the year, or, in fact, the past two years. The rain has been falling steadily and copiously for several days, and from all quarters of the State come encouraging reports from agricultural and mining districts. The farmers are joyful, since all fears of a dry season are gone and they see visions of a bountiful crop. The miners, who have been impatiently waiting for the water season to begin, will soon be turning the heavy stream against the gold-producing banks of gravel and repay themselves for so long a period of enforced idleness. The business men of the cities and towns see in the bounteous rains, prospects for a revival of business once more; and the working community see in it renewed chances for employment, so much needed. The miners throughout the State were beginning to despond at the long continued dry weather. The season of last year was short, as shown by the falling off in bullion product of this State. Having closed down their claims much earlier than usual, they hetrook themselves to preparing for this season's work, and nearly all the hydraulic mines of the State are in better condition in this respect than for many years past. The low stage of water in the ditches and flumes has given a good opportunity to have repairs made, so that now the water has come the miners are all ready for it. Under the circumstances, if a heavy snowfall in the Sierras stores up a good summer's supply of water, we ought to have the best gravel mining season for many years. The open winters have been very acceptable to the quartz miners, who have worked to much greater advantage than in wet winters; but they can afford to slow up for a while, in those regions where it is necessary, for the sake of seeing all hands at work again.

A MINER named Gray, an employee of the Eberhardt and Aurora Tunnel Co., White Pine, had his right hand blown off Tuesday, by the premature explosion of a blast.

Mining in 1877.

A Review of the Record of the Pacific Coast for the Year

We present herewith our usual annual review of mining interests and operations during the preceding year throughout the countries lying west of and adjacent to the Rocky mountains; premising that our remarks upon individual properties and localities must necessarily be brief where extended over a region so vast. The territory on which this business is now being actively prosecuted covers more than a third of the Union; and it is the case, too, that this industry as it expands becomes every year more and more diversified. From searching after and gathering gold alone, and by the simplest methods, it has come to include in its objects a great variety of minerals and metal, requiring for its successful prosecution the employment of large capital, costly and complicated machinery, skill and science. While this industry has been marked during the year by no feature or event calling for particular notice, it has still made gratifying advances as regards both its moral and material status; this remark applying with special force to mining for the precious metal. While there has been, as heretofore, too much attention paid to speculative operations and the manipulation of stocks, we have fewer failures in the

More Practical Departments of the Business

To note than ever before. Investments are being made with more caution and better judgment, deeper exploration and ore development being conditions precedent to the erection of works or other heavy expenditures. Then, too, this pursuit is being brought every year more and more into harmony with the normal conditions of labor. During a year distinguished the world over for strikes and a general discontent, the operative miners on this coast have abstained from acts of violence designed to intimidate employers or advance the current rates of wages, there having been, in fact, but little grumbling amongst this class, either on account of want of employment or the wages paid. The old stock of miners with us, being unaccustomed to work for wages, did not, for a time, give entire satisfaction as day laborers. The self-employed is apt to be adventurous, energetic and restless, tendencies that sometimes so grow upon him that they cannot be easily restrained when it becomes necessary for him to enter the service of others. Through the changes wrought by time and the introduction of workmen from abroad there exists here now as little trouble between the employer and the employed as in almost any other country. Our mining population is fast losing its nomadic character and adjusting itself to its new surroundings, and as the temptation to roam is constantly diminishing it will not be long before the terms "rush," stamped and like other expressions will become obsolete in our mining vocabulary. With the abatement of these exciting scenes and their cause there has still been kept alive, however, enough of the spirit of enterprise and adventure to insure the carrying on of

Constant and Energetic Exploration.

A number of mineral ore mines having been made the past year, and some new ore-bearing districts opened up. The most important of these discoveries have occurred in Arizona, that Territory opening to the prospector a broad, virgin field. Nevada, Utah, Dakota, and others of the inland States or Territories, still present inviting grounds for exploration, the discovery of seemingly valuable ore fields and a great extent of metalliferous lands being reported off that way. That the newly-found gold-bearing deposits of Dakota, though of eccentric formation and but little explored, will eventually show considerable capacity for bullion production, seems probable enough. Through the discovery of very promising gold-bearing lodes in the Cariboo region, British Columbia, an additional industry and a new form of mineral wealth seem likely to be given to that region. Some of the lodes lately found, near old placer mines of acknowledged richness, ought to prove valuable, or the theories in this connection are fallacious. It may be stated, also, that well authenticated accounts reach us of important gold discoveries in the more distant colony of New Zealand, with rumors of new quartz reefs and limited placers being found in some parts of Australia.

Through the successful explorations carried on at home, the area of our new-found metalliferous territory has been much enlarged, southern Utah, central Arizona and Dakota having been the theaters of the most notable expansion. In this connection it should be observed that our means and efforts are not wholly devoted, as in older countries, to the exploitation of deposits already found. A large share of our active exertions is directed to searching after additional fields and new forms of mineral health; and it is but just, when canvassing our achievements for the year, that some allowance be made for the energies expended in the furtherance of these objects. Our means are not all absorbed in utilizing resources already in hand, but we keep a large force of prospectors skirmishing in and sometimes far beyond our active mining frontier. While so much success has attended explorations carried on in remote districts, some of these efforts have resulted in

Disappointment and Failure.

Early in the summer, several well appointed

expeditions, fitted out in Wyoming, Dakota and Montana, visited and pretty thoroughly examined the Wind river, Big Horn and Yellowstone countries, without finding either paying placers or promising vein mines. The best surface diggings met with are reported as yielding not over \$1 or \$2 per day, being small and widely scattered at that. This was a region of traditional wealth, many extravagant stories having been told by the Indians, trappers and traders concerning the gold fields. Even Father De Smet, who had spent many years as a missionary among the northwest tribes, is said to have encouraged the idea of there being rich placers in the Big Horn country, asserting that he had himself had ocular proof of the fact. The examinations made the past summer would seem to negative all these stories, though the country without doubt possesses considerable resources in the way of agricultural lands, grass, water, timber, etc., abounding also with fish and game. From the gold-producing lands of Isabre, Guatamala, towards which some of our adventurous Californians had begun to look with longing eyes, an adverse report from an authentic source also comes to hand. Martin Durfee, a veteran prospector on this coast and an intelligent and trustworthy man, after a visit, made last summer, to the South African gold fields, tells us that they are tolerably rich but of limited extent, being confined to a narrow strip of territory, and so completely occupied, that there is no chance for a new comer to secure a claim, except by purchase, everything reduced to possession being held at a price above what it is worth. The country offers no inducement to the American prospector, capitalist or miner, both the gold and the diamond fields being all occupied and overrun with people out of means and in search of employment. In Chile, some American capitalists have just taken hold of the Catapilco gravel mines, but sufficient time has not elapsed to prove that the ground is profitable to work, although it is represented as much richer than our California gravel claims. The rehabilitation of

Old and Nearly Deserted Camps

And districts may be said to constitute a feature of the year among these restored localities, the Bodie district in Mono county, California, furnishes a noted example. Among other instances of this kind, may be cited Morris City and Moore's Flat in this State. Tuscarora, Cherry Creek and Ward districts in Nevada, together with several heretofore languishing and nearly depopulated camps in Utah and numerous places in the Black hills country. There has been in fact a great deal of this resuscitating work done in a minor way all over the coast. California having experienced her full share of it. Among the towns in this State that present just now a thrifty if not a particularly lively aspect, may be mentioned, Smartsville and North Bloomfield, with several other small places on the San Juan divide. Drytown and Sutter's Creek in Amador county; Placerville in El Dorado; Damascus and Dutch Flat in Placer; Grass Valley and Nevada City in Nevada; Oroville in Butte, besides various camps, hamlets, and considerable towns further north in Trinity and Siskiyou counties, there having been no increase of population or revival of the industry in the more southern portions of the State.

With this improvement of a general kind and the inauguration of more staid and frugal habits, before explained, the era of

Big Strikes, Chispas and Nuggets,

Does not appear to have wholly passed away. Constantly these rich finds are occurring, reminding us of the old-time luck, when miners realized fortunes in a week, and sometimes in a day. And it is probable that these strikes happen oftener than is popularly supposed, miners being more chary now than they used to be about publishing them to the world. The Chinese, who on account of their plodding habits, and peculiar methods of pursuing the business, are remarkably lucky in this respect, but never et their good fortune be known if they can help it, the reasons for this being many and obvious. Very often John's earnings are not wholly his own; he works the claims of white men on shares or he may be obliged to divide the fruits of his toil with certain of his countrymen, being in all cases forced to contribute to a variety of objects in proportion to his gettings, whether honestly come by or otherwise. The possession of wealth in the convenient form of gold dust of course, to be known, greatly exposes him to the despoiler who appears sometimes in the disguised "Melican man," but oftener in the more dreaded agent of the "Six companies," who, through their emissaries, not only are all powerful but well nigh omniscient and omnipresent. But despite his efforts at covering them up these instances of Mongolian success often come to light. A Chinaman working a placer claim at Columbia, Tuolumne county, picked up last summer, a piece of gold worth nearly \$300. A company of these people working a river-bed claim, on the Middle fork of Feather river, took out, not long since, a number of chispas weighing from one to fourteen pounds each, the total value of their find having been estimated at not less than \$15,000 to \$20,000. For a considerable length of time the Chinese were in the habit of selling to the hankers in Placer county chunks of gold weighing from two to 10 ounces each that had evidently been chiseled from a large mass, the entire quantity so disposed of amounting to several thousand dollars. While the Chinese seem to have had more than their share of this good fortune, the latter has by no means been confined to this race. All over the coast we hear of big strikes, valuable ore finds

and nuggets being unearthed or picked up in sluices and from dump-piles by the whites, these instances being too numerous to be mentioned other than in a general way. From Arizona several small lots of remarkably rich ores have been received during the year, the most of them taken from the Silver King and the Stonewall Jackson mine. These parcels of ore varied from 500 to 600 pounds to a ton or more in weight, being independent of much larger shipment of very rich but lower grade ores received from that quarter.

General Aspect and Condition of the Business.

Mining during the year has developed no feature of special interest, nor has anything occurred in connection with this industry calling for particular comment. The business has run along with smoothness and without more than its ordinary causes of excitement. It is coming every year to be pursued like our other great callings, with intelligence and care, and in a quiet, systematic way. Practical mining—for this like many other legitimate vocations, has its speculative side—is being engaged in and followed much like farming, merchandizing and similar pursuits. Its importance in itself and as an aid to our other industries is now fully appreciated and acknowledged by all classes, little of the jealousy once manifested towards it being now shown. Bullion, like wheat, and coal and cotton, has become one of the great staples of the country, and exerts a controlling influence on our national trade and commerce. Mining pays the best wages for labor and the highest price for everything it requires, and it pays with as much promptness and as few failures as any other business.

Bullion Made in 1877.

The bullion production of our mines the past year has been large, exceeding the yield of any former year by more than seven and a half million dollars. That the product has fallen short of the expected round hundred million by a little may be attributed to the drouth that prevailed so generally throughout the mining regions, the bullion like the cereal crop of this coast being largely dependent on the water supply.

The bullion yield of the year is summarized in the following letter of John J. Valentine, General Superintendent of Wells, Fargo & Co.'s Express. It furnishes the most reliable statistics on this subject which it is possible to produce.

EDITORS PRESS:—The following is a copy of our annual statement of precious metals produced in the States and Territories west of the Missouri river, including British Columbia and the west coast of Mexico, during 1877, which shows an aggregate yield of \$98,421,754, being an excess of \$7,546,581 over 1876, the greatest previous annual yield in the history of the country. Arizona, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah and Washington increase; British Columbia, California, Mexico and Montana decrease; but it is possible the falling off in Montana is more apparent than real. In our statement for 1876, Dakota (Black Hills) was not mentioned. It appears herein credited with \$1,500,000 gold, but the estimate is uncertain, as \$950,000 is the total amount carried out by all express companies and mail. The amount named as carried by other conveyances is conjecture. If the Comstock mines yield as much in 1878 as during the past year, the aggregate product of silver and gold will approximate \$100,000,000.

Statement of the Amount of Precious Metals Produced in the States and Territories West of the Missouri River, During the Year 1877.					
States and Territories	Gold dust and bullion by express.	Gold dust and bullion by other conveyances.	Silver bullion by express.	Ors and base bullion by freight.	Total.
California.	\$14,512,128	\$725,006	\$1,201,751	\$1,734,226	\$18,174,111
Nevada.	402,661	108,696	436,277	1,919,897	2,867,530
Oregon.	993,881	8,834	1,191,807	318,499	2,313,021
Washington.	83,410	171,091	202,295	318,499	705,295
Idaho.	1,140,010	184,421	436,277	1,919,897	3,610,605
Utah.	91,104	0,110	1,409,861	6,573,575	8,084,546
Colorado.	3,151,277	31,850	1,394,411	273,840	5,651,378
New Mexico.	31,850	122,857	506,519	1,759,206	2,319,422
Arizona.	950,000	500,000	1,020,636	340,212	2,710,848
Dakota.	721,144	11,653			732,797
Mexico.	1,165,297				1,165,297
British Columbia.	\$24,671,400	\$1,563,331	\$53,600,214	\$10,201,209	\$89,421,754

We have used the utmost care and diligence

in ascertaining the character of bullion and ores reported, with the following result. The yield of the Comstock mines is 45% gold; of the whole bullion product of Nevada, 37% is gold; and of all so-called silver or base bullion, 28% is gold. The gross yield for 1877, shown above, segregated, is, in round numbers, as follows:

Lead, 5 \$5,085,250
Silver, 48 47,200,957
Gold, 47 49,124,547

As lead is an important element in what is herein termed base bullion, we might add that of Missouri and Illinois, value approximately \$1,500,000; which, with the silver and gold of the Lake Superior country, Virginia and North and South Carolina, amount say \$500,000, would swell the gross product to over \$100,000,000 for the year. The lead product of Utah, Nevada and California, exceeds that of the remainder of the United States and Territories combined; and in tonnage is greater this year than ever before, though not exceeding in value that of 1876, the average price having been lower than for many years past.

In our statement of 1876, the amounts credited to British Columbia and west coast of Mexico, were inadvertently carried into the totals credited to the United States, in the estimates given on the right-hand page of the statement. Deducting amounts from the sources named, the results are as follows:

Year.	Production per W. P. & Co. statements, including amounts from Br. Columbia and Mexico.	Production, less amounts from British Columbia and Mexico.	The net product of the United States and Territories west of the Missouri river, divided is as follows:		
			Lead.	Silver.	Gold.
1870..	\$64,000,000	\$52,150,000	\$1,080,000	\$17,320,000	\$33,750,000
1871..	58,264,000	57,784,000	2,100,000	13,256,000	34,336,000
1872..	62,238,500	62,351,824	2,250,000	19,721,429	38,109,305
1873..	72,258,683	70,129,860	3,450,000	27,443,302	39,206,558
1874..	71,401,015	71,935,610	3,800,000	29,699,122	38,406,438
1875..	80,893,057	76,703,433	5,100,000	31,635,239	39,968,191
1876..	90,375,173	87,210,251	5,040,000	33,922,221	42,888,335
1877..	98,421,754	95,511,528	5,085,250	45,846,109	44,889,223

We are uninforming as to the actual exports of silver to India, China and the Straits previous to 1851, but assume that they were less than since that date, which being so, the exports this year are the greatest known, viz.: \$105,000,000 to the 26th inst. The greatest amount in former years was \$83,650,000, in 1857. The amounts exported during the present year were approximately as follows: From Southampton, \$80,000,000; from San Francisco, \$19,000,000; from Marsilles, \$4,000,000; from Venice, \$2,000,000.

We take pleasure in acknowledging the prompt responses of persons applied to for information, and to whose cordial co-operation we are indebted for much of the data necessary to our compilations.

JNO. J. VALENTINE,
General Superintendent.

When we come to recollect that the bullion production of the country for the past four years has been \$343,587,379 in good solid coin, people will appreciate somewhat the importance of the mining interests. This money has been direct production out of the very ground itself, and in getting it thousands and thousands of men have been given employment, and as many families support. This sum is gradually increasing each year, and in all probability will have a production for 1878 of over \$100,000,000 from our mining interests. The falling off in California this year is due entirely to the dry summer and short water season which has prevented the usual yield from the hydraulic mines, which produce the greatest proportion of California's total yield. Judging from the prospects as we write this will not occur the current year. The claims have been idle so long that they have been properly prepared for rapid work when the water comes, and most of them are in better condition than they have been for years.

In this connection the production of coin at the Mint is interesting. The San Francisco Branch Mint made the largest coinage in 1877 of any Mint in the world in a similar length of time. The total coinage for the year was \$49,772,000, in 28,025,100 pieces. The Carson Mint also coined \$4,020,020, making a total coinage of the two Pacific Coast Mints, for the year, of \$53,792,020.

Assessments and Dividends.

Of course the questions of assessments and dividends is an all important one to the owners of mining property. While the bullion production of 1877 was the largest one ever had the amount of assessments has been the smallest for three years. The heaviest assessments as well as the heaviest dividends have come from the Comstock lode. The following table will show the total assessment for several years:

Delinquent in 1873.....	\$ 6,671,000
" 1874.....	6,777,000
" 1875.....	11,880,000
" 1876.....	11,008,000
" 1877.....	11,598,000

These figures, which we take from the *Bulletin*, comprise the total assessments of mines in California, Nevada, Oregon, Utah, Idaho and Arizona. Some of the mines have levied as many as five assessments during the year, which is the full limit allowed by law, as it takes over two months to collect an assessment and the second one cannot be levied until the first is all accounted for. Others levied four; a larger number levied three; and a still larger only two. In a majority of cases only one assessment was collected. The heaviest assessments, exceeding \$100,000, were Alta, \$216,000; Bullion, \$650,000; Baltimore Con., \$168,000; Belcher, \$312,000; Best & Belcher, \$201,000;

Con. Imperial, \$450,000; Crown Point, \$400,000; Caledonia, \$225,000; Chollar, \$224,000; Dayton, \$125,000; Deer Creek, 120,000; Gould & Curry, \$324,000; Golden Chariot, \$135,000; Hule & Norcross, \$336,000; Julia Con. \$330,000; Justice, \$525,000; Lady Washington, \$150,000; Martin White, \$400,000; N. Con. Virginia, \$155,000; New Coso, \$150,000; Overman, \$345,600; Savage, \$560,000; Silver Hill, \$162,000; Utah, \$140,000; Yellow Jacket, \$480,000. With three exceptions these are all claims on the Comstock, but the largest dividends came from that section also. The other mines not enumerated bring the total amounts up to \$11,598,000.

The mining companies paid to stockholders in 1877, in dividends, the magnificent sum of \$25,125,700, about three times as much as all the city, commercial and savings banks, gas, water, insurance, express, powder, telegraph companies and other public corporations combined. The total dividends by local corporations for the year were \$34,366,800, of which the mining companies paid \$25,125,700. This part of the business is not stock jobbing either, but good, solid coin, right out of the ground, and is where the legitimate part of the mining industry comes in to prove its value. And yet there are people who think mining is all a gamble and the sooner it is stopped the better. When they come to consider the figures which shows the results of the year's work and the profits of mining, which exceed by three times all the other corporate interests of the city combined, perhaps it will set them to thinking that mining—that is, real mining, not stock jobbing—sometimes pays after all. There were more mining companies on the dividend roll last year, says the *Bulletin*, than in any previous year since this industry was first prosecuted.

The Black Bear quartz mine of Siskiyou county paid three dividends of 25 cents per share each, two of 40 cents each and one of 50 cents. The Great Western quicksilver mine paid four of 25 cents each. The Empire mine of Sierra county, 13 dividends during the year, equal to \$15.50 per share. The Empire of Nevada county paid three dividends, each of 25 cents per share. The Consolidated Amador of Amador county paid 10 monthly dividends of 25 cents each and then ceased. Since the reorganization of the Excelsior water and mining company, six monthly dividends of 25 cents each were paid in the last half of the year. The South Feather water and mining company paid one dividend of 50 cents per share in August. The Modoc mine of Inyo county paid its first and only dividend of 50 cents per share in January, 1877. The Idaho mine of Nevada county paid seven monthly dividends, each of \$7.50, and five of \$5 per share. The December dividend of this mine made a total of 100 paid since work was commenced. The Centennial mine of Nevada county paid its first and only dividend in February. The Hite mine of Mariposa county paid four monthly dividends, from March to June inclusive, each 20 cents per share. In the early part of the year it was decided to abandon the Eureka mine at Grass Valley, which has been one of the best paying gold mines on the coast. As the result of the sale of certain property and the clearing up of ore and sulphurets, the mine paid three dividends during the year, two of \$2 each in May and August, and one of 50 cents per share in December. These were the only dividends paid by the mine since December, 1873. The LaGrange ditch and hydraulic mining company paid three dividends of 25 cents each in May, August and December. The North Star mine of Grass Valley divided up a small surplus in September, equal to \$2 per share, the first dividend in years, the mine having been abandoned about five years ago. The North Bloomfield gravel mine paid its first and only dividend of \$1 per share in October. The Standard mine of Mono county commenced paying dividends at the rate of \$1 per share in September, and the same rate in October, November and December. The foregoing mines are all California claims. The Idaho mines did not pay a dollar in dividends last year. Two mines in Utah Territory were entered on the dividend list for the first time last year. The Ontario mine commenced paying in March at the rate of 50 cents per share, and paid regular and five extra dividends at that rate during the remainder of the year. The Leeds commenced paying in August, and paid four monthly dividends, each 20 cents per share, and then ceased. It is understood, however, that the present stoppage is only temporary. At the close of the year, two Arizona mines went on the dividend roll, the McMillan mine paying one dividend of 30 cents per share in November, and the Silver King two, each of 50 cents per share, in November and December. We now come to the Nevada mines. Of the hundreds of claims being worked in that State, only seven paid dividends last year, so far as we can learn. The California mine paid 12 of \$2 per share each and the Consolidated Virginia eight of \$2 per share each. These amounted to \$1,080,000 each for each mine. The Eureka Consolidated mines resumed dividends in September, after an interval of nearly three years, and just after winning an important law suit affecting its ore body. During the last four months of the year it paid four dividends, each of \$3 per share. The Manhattan mine paid, last January and February, at the rate of \$1 per share, but nothing since. The Northern Belle mine paid 11 dividends in 1877, at the rate of \$1 per share, and then ceased, making 30 consecutive monthly dividends paid by the mine—a feat accomplished by no other Nevada mine of the Comstock lode. The Rye Patch Consolidated mine resumed

dividends in July, for the first time since March, 1875, and during the remainder of the year paid five dividends of 25 cents each, omitting the one for September. The Grand Prize mine of Elko county, Nevada, paid its first dividend of \$1 per share in September, and another of the same amount in December. The list of Nevada mines is not so large as we hoped it would be, and but for the dividends from the California and Consolidated Virginia, the showing would be insignificant for the present stage of development of the mineral resources of that State.

The bullion produced in this State amounted last year to \$18,174,716, adopting the estimate of Mr. Valentine, whose estimates in this department of statistics, are always conservative, never having been accused of being too large. At the beginning of the year it was generally expected that the mines in this State would turn out at least \$20,000,000, and this, no doubt, would have been the case, but for the almost unexampled dearth of water which cut short the usual period of hydraulic washing fully one-fourth, the business of quartz mining having suffered to nearly a like extent. Being left with much leisure on their hands the miners have generally employed it in obtaining improved machinery and otherwise outfitting their properties and putting them in good shape. If less quartz is crushed, there is also water to be raised from the lower workings of the mines, what militates against one branch of mining often helping another. A low stage of water in the rivers favors the operation of those who wing-dam or by other means seek to work their beds, though it implies a bad season for most other classes of miners.

Between mining employers and employees there have occurred in this State during the year, none of those difficulties that elsewhere have led to bloodshed and riot, no issues touching the question of short hours, wages, etc., having been raised between these two classes. Ten hours, as has always been the case, in the mining regions, is considered a day's work, wages for white men varying from \$2 to \$3 per day, the average being about \$2.50. Only first-class underground miners receiving \$3 per day. In Nevada and all the other mining States and Territories wages average about one-quarter more than in California. Chinamen, where employed, receive from one-half to two-thirds the rates paid white men. These people are not employed as underground hands to any extent except in the drift diggings in this State, where a good number of them are engaged. Some of the large drift companies, however, have never had any of them in their service; and this from principle, as they are admitted to answer very well in this class of mines, save that close watching is necessary to prevent their pilfering the gold, at which they are adepts, stealing often many times the value of their wages despite the vigilance of owners. The Bald Mountain and the North Fork companies at Forest City, the former much the largest in this State, have never employed any Chinamen, nor yet the large and prosperous drift companies about Damascus and elsewhere on the Forest Hill divide.

Quartz Mining.

There are now over 400 quartz mills in California, the most of them fit for and fully two-thirds of them in active service. There are also several cement crushing mills and some 15 smelting works in the State, the former mostly in Placer and Calaveras counties, and the latter all in Inyo county, erected for reducing the smelting ores found as yet only in that district. Of these mills one-half are driven by steam and the balance mostly by water, about 20 being driven by steam and water alternately, as the water may render recourse to steam necessary. In a few instances, these propulsive elements are employed conjointly. The first mill of this kind in the State was put up in 1850, the pioneer locality being a contested but unimportant matter, inasmuch as several of these structures were in course of erection about the same time. Two of these mills, the Phoenix, Amador county, and the Sumner, Kern county, carry each 80 stamps. The Oneida mill at Jackson, Amador county, and the Paloma, Calaveras county, each carry 60 stamps, and the Beaton, in Mariposa county, 64 stamps; the Mariposa mill, also in Mariposa county, carries 50 stamps. Ten to 15 is the average number of stamps to the quartz mills of the State, though quite a good many have from 20 to 40. The six mills belonging to the English company at Sierra Buttes, have 178 stamps, all running on ore from that mine. The greatest number of mills—63—is in Nevada county, the most stamps being in Amador, which contains 41 mills, the same number as El Dorado. The expense attending the erection of these mills has varied from a few thousand dollars or more to \$100,000 or more, their average having been from \$20,000 to \$30,000. About a dozen new mills were put up last year in different parts of the State, besides two or three cement mills and several smelting furnaces.

While quartz mining has been somewhat crippled the past year on account of the drouth, it has still been prosecuted with vigor, having turned out nearly the average amount of bullion with usual profits. Like other branches of mining this is being every year brought into better condition, being carried on with constantly increasing intelligence, economy and system. Improvements, mechanical, chemical and industrial, are in steady progress, and it will not be long till we shall have pretty well overcome the many troubles that have heretofore beset this industry, retarding its progress, har-

ring out profits and rendering it generally unsatisfactory. The trouble of treating our highly sulphuretted and otherwise refractory ores has not yet been conquered, none of the processes aspiring to the accomplishment of that end having fully answered the purpose. We are making progress, however, in that direction, and do not despair of being able to so far overcome these obstacles as to reduce their gravity to a minimum, if we do not vanquish them altogether.

Amador and Nevada counties as ever before have continued the most prosperous quartz mining localities in the State, there having been some revival of this industry in El Dorado and to a lesser degree in Calaveras and Placer, and perhaps some of the more northerly counties of the State.

Hydraulic Mining

As before observed, has suffered serious curtailment the past year by reason of short water supply. Nevertheless some of the companies provided with their own ditches have made a fair, and, in a few instances, a good season's work. The North Bloomfield company, for instance, report a gross production for the year of \$291,125.42. The following two mines belonging to the Milton company report for the same time—French Corral, \$233,003.30, and the Manzanita \$155,713.10. The Excelsior company, at Smartsville, has probably washed out as much as either of the above, while the Spring Valley, at Cherokee, has done a good deal more. The Gold Run, Little York, Nevada, Cedar Creek, Blue Tent, and several companies on the San Juan and Forest Hill divides have made many large clean-ups during the year, and have probably not fallen much below their average production. Meanwhile the outlook for this branch of mining for the present year is good, and growing every day more encouraging, the late copious rains affording them water for present washing, and it only requires that these should be followed by a large accumulation of snow in the Sierra Nevada to insure for this interest a prosperous year.

As a general thing our hydraulic miners employed the leisure afforded them by the late dry summer to a good purpose. Some new ditches have been constructed and the old ones everywhere cleaned out and repaired. Much iron pipe has been substituted for wooden flumes and other less secure and permanent structures. Branches for conducting water from the main canals into new localities have, in many instances, been built, the main trunk having also in some places been extended. Several of the larger and more prosperous hydraulic companies, such as the Milton, Blue Tent, etc., have greatly enlarged their old reservoirs or built new ones, thereby much increasing their summer stock of water. Many of the pits have been opened with long bedrock tunnels, admitting of the lower and richer strata of ground being worked and receiving permanent outlet and drainage.

The length of main canals that have been built in this State, mainly for the purpose of supplying this class of mines with water, aggregate fully 6,000 miles, exclusive of 1,000 miles of subsidiary ditches, designed for carrying the water into lateral localities or otherwise securing its proper destination. A great many reservoirs of large capacity have also been built for water catchment in the mountains; the money expended on these improvements amounted, first and last, to \$25,000,000. For opening and outfitting claims, and bringing them into condition for washing, large sums have also been expended, to say nothing of the money laid out in the purchase of these properties. The heaviest expenditures made on account of these artificial structures for the storage and conducting of water have been in Nevada county, El Dorado, Placer and Amador ranking next. The most costly enterprise of this kind has been the South Yuba canal, Nevada county, though the outlay made on the properties of the North Bloomfield, Milton, Eureka Lake, El Dorado Deep Gravel and the California Water companies, has not been much less.

Drift Mining

Like hydraulic is a branch of the business not much practiced outside of California, it being even here of secondary importance. It is pursued by tunneling through the side rims of the old pliocene rivers and other deep lying gold-bearing channels, and removing through the adits so opened their auriferous contents, these having been first drifted or dug out with picks. Though not new, having been followed in this State from the first, it is only within the past few years that it has assumed large proportions. It was in searching after this class of deposits that the early miners suffered so much; many of the tunnels run by them having proved failures, through ignorance as to the proper levels upon which they should be driven. Experience having enabled them to correct these mistakes, the drift mining has since been carried on with more success. Most of the companies carrying on this business are made up of practical miners; Slate Creek, Forest City and Damascus being the sites of the most extensive operations. A great many companies have been formed during the past year and the probabilities are we shall see an early expansion of this business, as it has little risk and frequently pays well.

Nevada.

In the data connected with the principal mines in this State, as above presented, will be found the most important facts bearing on its general mining interests, which, as a whole, have

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PATENTS obtained promptly; Caveats filed expeditiously; Patent Reissues taken out Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examinations ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Interferences Prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Agency Business promptly and thoroughly conducted.

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We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

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Business Directory.

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UNITED STATES
Mineral Land Laws, Revised Statutes,
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We have just issued a pamphlet containing the General Mineral Land Laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with Instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1896; Mining Statute of July 9th, 1870. Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Registers' Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Charge of Fees; Proof of Ownership and Possession in Case of Loss or absence of Mining Records; Affidavit of Citizenship; Certificate that no Suit is Pending; Power of Attorney; Protest and Adverse Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, post-free, for 50 cents. It should be in the hands of every one having any mining interests. DEWEY & CO.,
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Contents of Pamphlet on Public Lands of
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Abstract from the U. S. Statutes.—The Law Concerning Pre-emption; Concerning Homesteads; Amendment Act Concerning Timber; Miscellaneous Provisions; Additional Surveys; Land for Pre-emption; List of California Post Offices. Price, post paid, 50 cts. Published and sold by DEWEY & CO., S. F.

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Fig.1

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Fig.2

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TWENTY-FIFTH YEAR—1878.
Hall's Journal of Health.

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For the half year ending this date, the Board of Directors of the German Savings and Loan Society has declared the dividend on term deposits at the rate of eight and two-fifths (8 2-5) per cent, per annum, and on ordinary deposits at the rate of seven (7) per cent, per annum, free from Federal taxes, and payable on and after the 15th day of January, 1878. By order
San Francisco, Dec. 31st, 1877. GEO. LETTE, Sec'y.

DIVIDEND NOTICE.

The California Savings and Loan Society, junction Market, Eddy and Powell.—The Directors have declared a dividend of eight and two-fifths (8 2-5) per cent per annum on term deposits and seven (7) per cent on ordinary deposits for the half year ending December 31, 1877, free from Federal tax, and payable on and after Monday, January 7, 1878. By order
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COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Polisher, M. Co.	Waco	12	1.00	Dec. 17	Jan. 10	Feb. 7	J. C. Gresham 412 S. M. St.

Chollar-Potosi M Co	Washoe	14	3 00	Jan 7	Feb 12	March 5	W E Dean	419 California st
Gen Lee S M Co	Arizona	1	5	Dec 3	Jan 5	Jan 29	T E Atkinson	310 Pine st
Coulter & Chum M Co	Washoe	22	1 00	Dec 17	Jan 22	Feb 12	A K Dunbar	222 M st

Hale & Norcross M Co	Washoe	57	1 00	Dec 13	Jan 17	Feb 8	J F Lightner	309 Montgomery st
Julia Con M Co	Washoe	5	75	Jan 3	Feb 7	Feb 28	A Noel	419 California st
Martha M Co	Washoe	92	2 00	Jan 10	Feb 14	March 6	J S Kennedy	410 California st

Mint G M Co	Washoe	20	10	Jan 3	Feb 7	March 1	D A Jennings	401 California st
Navajo M Co	Washoe	3	40	Jan 2	Feb 11	March 5	R H Brown	Stock Exchange
Rock Island M Co	Washoe	13	20	Jan 9	Feb 12	March 5	W W Clark	418 California st
Sierra Nevada M Co	Washoe	1	100	Dec 3	Jan 30	Feb 9	W W Clark	418 California st
Sierra Nevada S M Co	Washoe	52	50	Jan 3	Feb 7	Feb 28	W W Stetson	309 Montgomery st
Trojan M Co	Washoe	6	25	Dec 27	Jan 28	Feb 18	D Wilder	328 Montgomery st
Yellow Jacket M Co	Washoe	28	2	60	Jan 2	Feb 2	P Ennis	Gold Hill
OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.								
Argenta M Co	Washoe	2	15	Dec 11	Jan 21	Feb 11	R H Brown	327 Pine st
Adelance S M Co	Cal	—	50	Nov 21	Jan 23	Jan 26	B Lingley	309 California st
Alvada M Co	Cal	1	10	Dec 8	Jan 23	Feb 25	F R Bunker	606 Montgomery st
Bulwer M Co	Cal	1	50	Dec 13	Jan 18	Feb 11	W Willis	309 Montgomery st
Del Rey M Co	Cal	2	3	Dec 15	Jan 31	March 2	S A Chapin	Merchant's Exchange
Desor Creek M Co	Cal	6	600	Jan 6	Feb 8	Feb 8	P W Carson	315 California st
Duryea M & W Co	Arizona	1	10	Jan 2	Feb 5	March 4	J Hardy	419 California st
El Tesoro M Co	Lower Cal	5	5	Jan 12	Feb 13	March 6	W H Chickering	214 Sansome st
Equitable Tunnel & M Co	Utah	16	10	Dec 19	Jan 24	Feb 13	C S Healey	Merchant's Exchange
El Dorado Slate Co	Cal	3	30	Jan 3	Feb 3	Feb 18	H Ehlert	524 Sacramento st
Falcon M Co	Cal	15	15	Nov 27	Dec 31	Jan 3	R H Brown	327 Pine st
Grey Eagle M Co	Cherry Creek	1	5	Jan 10	Feb 12	March 18	CT Bridge	224 California st
Gold Bar Gravel M Co	Cal	2	50	Jan 16	Feb 18	March 11	T F Hopkins	Stevens's Building
Goffrey Gravel M Co	Cal	2	5	Dec 1	Jan 7	Feb 7	J M Rutherford	309 California st
Gold Gravel M Co	Cal	2	5	Dec 1	Jan 7	March 2	F O Montgomery	309 Montgomery st
Hayward Can M Co	Washoe	2	25	Dec 15	Jan 17	Feb 7	J H Brooks	Pine and Sansome sts
Hartford M Co	Washoe	1	5	Nov 30	Jan 3	Jan 22	E F Stone	306 Pine st
Henlock Can M Co	Cal	1	2	Oct 24	Jan 12	Feb 11	N P Sheldon	402 Montgomery st
Lucky Jack M Co	Cal	1	5	Dec 6	Jan 12	Feb 5	W Willis	309 Montgomery st
Manzanita G M Co	Cal	13	100	Dec 3	Jan 3	Feb 3	Geo J Pratt	309 Montgomery st
Mariposa Land and M Co	Cal	13	1	00	Feb 7	Feb 11	L Leavitt	309 Montgomery st
Monarch Gravel M Co	Cal	1	75	Dec 1	Jan 3	Jan 21	F B Latham	426 California st
New England G M Co	Cal	2	10	Nov 27	Dec 31	Jan 18	D L Thomas	419 California st
New Cosmo M Co	Cal	7	50	Jan 7	Feb 11	March 6	W W Cardenal	327 Pine st
Summit M Co	Cal	3	10	Dec 10	Jan 21	Feb 26	J W Clark	418 California st
Sutro M Co	Washoe	3	2	Dec 22	Jan 30	Feb 20	A B Cathcart	327 Pine st
Silver Prize M Co	Washoe	1	15	Jan 3	Feb 3	March 1	C K Clark	1114 Leidesdorff st
South Overman Can M Co	Washoe	2	25	Dec 16	Jan 28	Feb 18	D Wilder	328 Montgomery st
South Overman M Co	Bodie District	1	10	Jan 13	Jan 19	March 1	W W Clark	421 Montgomery st
Timmy Chub M Co	Cal	1	50	Dec 4	Jan 7	Jan 21	G C Pratt	309 Montgomery st
Welch Can M Co	Cal	1	10	Dec 5	Jan 4	Jan 26	J F Forbes	420 Montgomery st

[illegible]

Alpine M Co	Cal	A P Kluit	328 California st	Annual	Jan 26
Alpine Project Extension M Co	Washoe	G R Spinney	310 Pine st	Annual	Jan 23
Carrollville Flint & Blue Gravel Co	Cal	A L Bogart	402 Montgomery st	Annual	Feb 24
Cofferson M Co	Nev	C A Sany	331 Montgomery st	Annual	Jan 24
Knickerbocker M Co	Nev	J H Sayre	330 Pine st	Annual	Jan 18
Kossuth M Co	Nev	E F Stone	806 Pine st	Annual	Jan 21
Raymond & Ely M Co	Nev	J W Pew	310 Pine st	Annual	Jan 22
Sulphur Bank Q M Co	Cal	L Hermann	220 Sansome st	Annual	Feb 4

LATEST DIVIDENDS—WITHIN THREE MONTHS.

California M Co	Washoe	G P Gordon	Nevada Block	2 00	Jan 15
Con Virginia M Co	Washoe	A W Havens	Nevada Block	2 00	Jan 14
Empire G M Co	Cal	Chas Collibson	309 Montgomery st	1 00	Nov 5
Eureka G M Co	Cal	R Wegener	414 California st	2 00	Aug 23
Excelsior Water & M Co	Cal	G P Thurston	315 California st	50	Jan 15
Empire M Co	Cal	D A Jennings	401 California st	25	Jan 21
Grand Con M Co	Nev	W W Traylor	309 Montgomery st	25	Jan 12
Grand Prize M Co	Nev	R H Erown	426 California st	1 00	Dec 12
La Grange Ditch & Hydraulic M Co	Cal	A Halsey	312 Montgomery st	25	Aug 13
Leeds M Co	Utah	D F Verdenal	409 Montgomery st	20	Oct 28
Northern Belle M Co	Nev	W Willis	309 Montgomery st	1 00	Nov 15
Pine Patch Con M Co	Nev	D F Verdenal	409 Montgomery st	25	Oct 22
Quand G M Co	Cal	W Willis	309 Montgomery st	1 00	Jan 9
Silver King M Co	Arizona	W H Booth	304 California st	50	Nov 20

0800 37 1 85005 080 37 37 1 0 751 1 G3 35 3 1

200 New York. . . 1.60@7 1/2	300 New Coso. . . 50c	400 Nevada. . . 50c
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240 Ophir. . . 52 1/2	390 Overman. . . 20@20 1/2	430 Nevada. . . 50c
100 Occidental. . . 1.1	75 Panther. . . 75c	440 Nevada. . . 50c
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650 Wheel. . . 90c	100 Yellow Jacket. . . 32	520 Nevada. . . 50c
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California Board. Latest Sales

Voluntarily Sold		Latest Sales.	
Wednesday A. M., Jan. 16.		200 Alexander.....	27
20 Alta.....	94	200 Andes.....	85@87 1/2
100 Belmont.....	11	50 Belmont.....	194@
40 Belcher.....	41 1/2	40 Belcher.....	41
40 Best & Belcher.....	15	30 Boyle.....	40c
40 Bulkion.....	54	30 California.....	25 1/2
16 Blue Jacket.....	11 1/2	60 California.....	25 1/2
60 California.....	25 1/2	60 Cal Virginia.....	25 1/2
60 Con Virginia.....	20 1/2@20 1/2	50 DePress.....	55c
100 Con Imperial.....	82c	150 Dayton.....	37 1/2
400 Creche.....	35c	130 Exchequer.....	41 1/2@44
60 Caledonia.....	51 1/2	30 Gould & Curry.....	74
50 Exchequer.....	41	525 Joe Scates.....	15@20c
40 Gould & Curry.....	74	20 Hale & Nor.....	103 1/2@107
90 Hale & Nor.....	97@99 1/2	280 Julia.....	1.60
100 Idaho.....	1.00	50 Idaho.....	1.00
100 Julia.....	1.65	40 Ophir.....	50
200 Leviathan.....	31c	10 Occident.....	1.10
50 Mexican.....	14c@14 1/2	60 Savage.....	11 1/2
50 Ophir.....	50	100 Star Nevada.....	40@42 1/2
50 Ophir.....	49@50	100 Star Nevada.....	40@42 1/2
70 Savage.....	11c@11 1/2	200 S Ophir.....	11
10 Sierra Nevada.....	4.30	500 Trojan.....	87 1/2@45c
300 West Bonanza.....	15	20 Union Con.....	61
400 Yellow Jacket.....	94	50 Wells Fargo.....	10c
690 Alta.....	93@94	20 Yellow Jacket.....	91

ALL the Pacific Coast Congressional delegation, except Senator Sharon, are again in Washington, to remain during the season.

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Wood—2½ cords at \$5 per cord.....	5 25
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Cost of one ton.....	2 61

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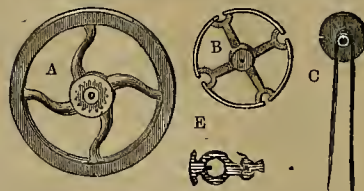
LATHES,

SCROLL SAWS,

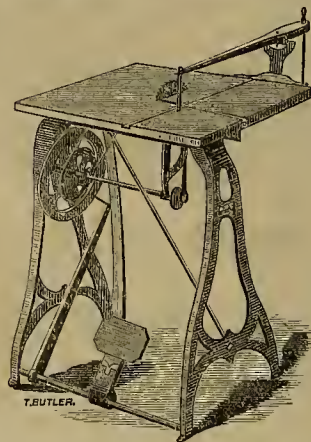
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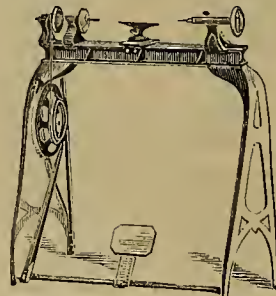


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OFFICE SUPERINTENDENT OF THE GOLD STRIPE G. M. CO.,

GREENVILLE, PLUMAS CO., OCT. 16TH, 1877.

JOSHUA HENDY, Esq.—Dear Sir:—Your favor of the 15th instant at hand. In reply to your inquiry as to the working of your ore feeders at our mill, we can say that there is no fault in the machines, and we consider them the best now in use. At present they are not in use with us, owing to the construction of the mill, which we are about to rebuild and make proper arrangements for putting in your feeders.

J. K. OWEN.

Superintendent Gold Stripe Mine.

One of the principal owners of the Gold Stripe and Green Mountain mills is also largely interested in the Plumas National mine, where I have just shipped several feeders, showing the confidence placed in the machine by these gentlemen who have used it.

Now, if Mr. Rodgers is sincere in his belief as to the merits of a rival machine over mine, here is a chance for him to make a thousand dollars easily, if he can get the owners of the machine to lend him one for the trial, which is the only doubtful thing in connection with the matter. Mr. Rodgers' eight months' experience with both machines ought to give him confidence enough in his own convictions to accept the challenge offered to him, or any one else.

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Silver King Mining Company, Arizona.	Boston Mill, Gold Hill, Nevada.
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Crescent Mine, Plumas County, Cal.	California Company, Nevada County, Cal.
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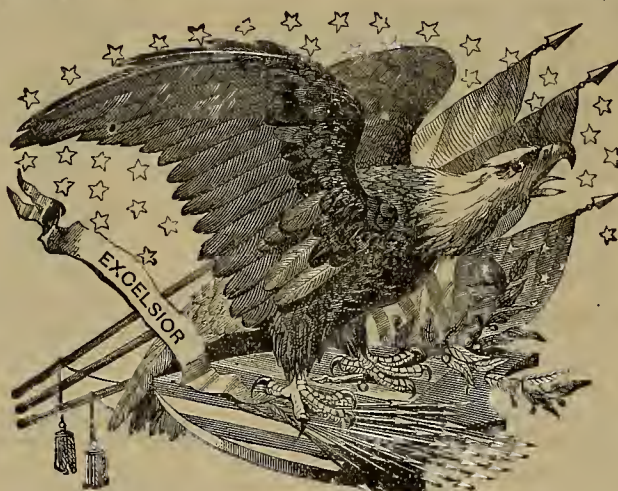
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SAN FRANCISCO, SATURDAY, JANUARY 26, 1878.

VOLUME XXXVI.
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The American Pipe Company's Pipe.

Some 18 or 20 years ago the Wyckoff pipe was introduced into the Eastern States, and at once attention was attracted to its peculiar adaptation for the purpose of conveying gas or water. It was found that when compared with iron, the wooden pipe was not only cheaper but better for certain purposes, and in March last an organization styled the American Pipe Company was organized in this city with a capital stock of \$250,000, for the purpose of manufacturing this pipe and thoroughly introducing it on this coast. The officers of this company are Robert G. Byxbee, of the firm of H. B. Ticknor & Co., President; John E. Chalfant, formerly of the Mendocino Lumber Company, Vice-President; John F. Byxbee, of Duncan Mills has Lumber Company, Secretary and Treasurer; Calvert Meade, Auditor; P. T. Dickinson, who been for the last 20 years connected with the manufacture of this pipe, General Manager. On the organization of the company a mill was started at Olympia, Puget sound, W. T., where the lumber is prepared, when it is brought to this city and taken to the factory of the company, on Channel street near Fourth, where it is finished ready for use. Some 50 or 60 men are employed at both places. The manner of making this pipe is peculiar, but may be easily understood by referring to the accompanying engravings. Fig. 1 shows a completed pipe; Fig. 2 the horizontal section and connections; Fig. 3, cylinder of wood; Fig. 4, bands of iron; Fig. 5, coating of hydraulic or asphaltum cement. It is made in sections of eight feet long, from Puget sound pine or Oregon fir. It is first bored, and then turned in a lathe to a uniform thickness of shell, removing all of the sap, and steamed thoroughly, to avoid any possibility of checking, or tasting the water. One end of each piece has a tenon of about three and a half inches, and the other is mortised to fit it closely. The swelling of this tenon, when driven home, makes a perfectly tight joint. The pipe is now ready for banding. This is done by winding the iron spirally around it, of a thickness, and at intervals required by the pressure to be sustained. The iron is coated on the under side as it is wound upon the pipe, and then the entire pipe and iron are thickly coated with asphaltum, producing a condition best calculated to resist decay in any form. The water pipe is coated on the outside only, as it is a well-known scientific fact that water, either salt, alkali or sulphur, does not affect wood, and in this city this pipe is used at the Mint to carry off the waste acids, while it is as well known that water will find the smallest crack in the inside coating of iron pipe, and cut its way out in a few months.

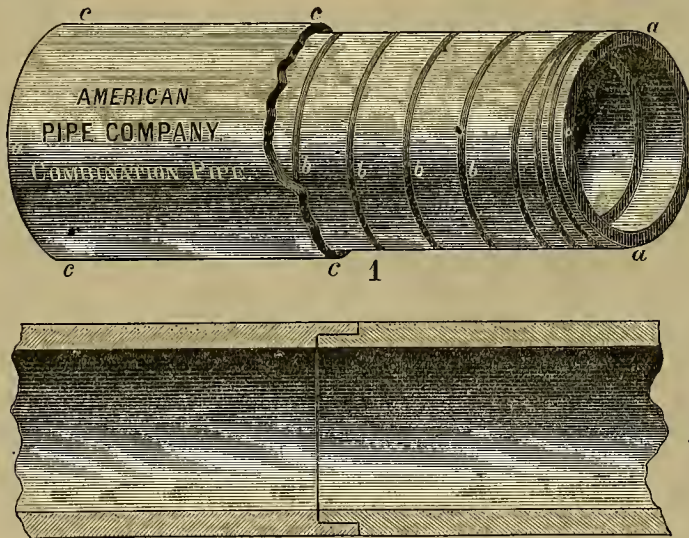
The gas pipe made by this company is made the same as the water pipe, except that it is coated inside, and is not bound as heavily with iron; and one great feature of the gas pipe is that it prevents condensation. Many severe tests of this pipe have been made, and when it is known that the pipe has been used in the East for the last 18 years, and nearly 1,000 miles of it have been thoroughly tested; that it has been brought into immediate competition with the best iron pipe; and when taken up to lay larger pipe, it has been found perfectly sound, and every foot relaid.

A very fine endorsement of this pipe is made by E. M. Morgan, Esq., Chief Engineer and Superintendent of the Santa Cruz Water Works, where it has been in use two years. They have 200 feet pressure all over the town, and he says he can lay 1,250 feet of six-inch pipe per day with four men, and that in all ways, tapping, laying, etc., the expense is far less than iron pipe. That this pipe must eventually come into general use, there can be no doubt, for it possesses the following advantages over any pipe in the world: 1st, it is the cheapest good pipe; 2d, it is the most durable of all pipes—practically imperishable; 3d, it neither expands nor contracts, and corrosion is impossible; 4th, it is more easily laid—can be tapped with an ordinary auger; 5th, it is more easily handled—lighter in weight, and perfectly tight; 6th, it is not liable to get out of order; 7th, it need not be laid so deep, and in cold climates will not freeze so quickly; 8th, when used for

water, it neither tastes of, or can be affected by, chemical ingredients; 9th, when used for gas it prevents condensation.

The President of the Santa Cruz Water company, Henry K. Moore, Esq., thus endorses the pipe in a letter addressed to the manager of the company: "I cheerfully comply with your request for my views respecting the Wyckoff combination pipe furnished by your company to the Santa Cruz Water company. Over 11 miles of the above pipe have been laid in the city of Santa Cruz. It has been in constant use for nearly 18 months under a pressure of not less than 150 pounds, and has stood the pressure admirably. We find that it works in every respect to our entire satisfaction, and we shall most decidedly give your pipe the preference in all extensions to be made by our company. In our opinion this pipe has decided advantages over iron pipe, such as saving of time and labor, in tapping and making connections, ease in repairing, cleanliness of water flowing in it, and great saving in cost and freight. With us the pipe is a success, and I can unhesitatingly recommend its use to any town or corporation, or persons desiring pipe for water works of any kind."

In June last this pipe was introduced upon the Central Pacific railroad and its branches for all purposes where pressure is required, and the



PATENT WOODEN PIPE, FOR WATER, GAS, ETC.

officers of the road give it their hearty endorsement. Since that time they have laid about 50,000 feet, and it is now superseding all other kinds of pipe.

By a special order issued from the War Department this pipe is now being used at all military posts, and it has been hauled over 400 miles into Arizona, to be used at Camp McDowell, where it gave entire satisfaction.

For use in mining purposes this pipe would be very economical. It possesses great strength and durability, and can be made to withstand a very heavy pressure. A great desideratum, acknowledged by all, is the ease with which it can be transported to the mines.

Messrs. J. S. and C. H. Briggs, owners of the Briggs mine, Central City, Colorado, write: "We take pleasure in recommending the pipe made by the American Pipe Company to miners in particular, as we have tried it in our Briggs mine, at Central City, Colorado, and found it better in every respect than we expected. We would not use iron pipe if it did not cost a cent a foot, if we could get the wooden pipe."

The American Pipe Company, as now organized, is an active company, with ample capital, and they are energetically introducing the pipe in every direction. The office is at 22 California street.

The Southern Pacific Railroad Company offer 1,000 men work at \$1 per day until they can find something better. The men are to be paid every night.

Ball's Excavator.

We witnessed this week, on the corner of Ninth and Franklin streets, Oakland, the operation of the Ball excavator, which is at work there. The machine is the first one of the kind which has been built, and has been examined by a number of persons interested in excavating machinery. It is intended for cutting canals, ditches, making excavations, and work of that character. The digging apparatus is a series of endless chains and buckets, many points in the machine being new improvements, and the whole is covered by several patents.

The main frame of the machine is V, or triangular shaped, being supported by a wheel at each of the two angles at the rear end of the frame, and at the other angle, or forward end of the machine, are two wheels very close together on a shaft, which are so placed as to be governed to steer the machine; by power derived from the engines, these two wheels also propel the whole machine forward or backward, as the necessities of the work demand.

Upon and inside of the bed-frame is another

so as to allow the machine to stand on the surface of the ground to be excavated.

This machine weighs something less than 10 tons, has two engines with 6x12-inch cylinders, with upright boiler of sufficient capacity. There are 12 buckets now on the machine, but it is intended for 11 more when the machine is set at regular work. The buckets weigh 102 pounds each, and hold about 2½ cubic feet.

The inventor, Mr. John A. Ball, claims that when the buckets are all (23 in number) on the machine it will excavate in ordinary upland hard ground an average of 1,000 cubic yards a day of nine hours. Aside from the boiler and engines there is very little wear except the wearing of the friction rollers on the chains and on the edges of the buckets. By having on hand extra pieces the worn-out ones can be readily taken off and repaired or new ones put on. It does not require more than 10 minutes to take off a bucket and put another on, which can be done out of working hours.

The machine now will cut at one stroke, without being moved, 28 feet wide and 10 feet deep, or will cut anything less in depth or width. If deeper excavation is required the ladder carrying the endless chain and buckets is extended to a greater length, no other changes being necessary. If a canal is to be more than about 40 feet wide it would be advisable to make more than one cut, in which case the second would be alongside of the first but would reach into the first and yet the machine would travel on the surface of the ground forward of its cut or excavation. By the simple moving of levers the depth or width of cut is regulated, the ladder hoisted or lowered, buckets moved to one side or the other, or the machine moved ahead or backward. The buckets cut a shaving of earth of the slope on which they are acting, and the thickness of this shaving can be regulated to the closest degree. In fact the buckets act like a planing machine on the earth. The work being done now is simply to demonstrate the effectiveness of the machine. Those interested in such machinery may see it at the locality indicated above. As far as we could see, in the place it is now at work, it appears to accomplish the object for which it is intended in a satisfactory manner. The buckets come down the ladder on the top side of the ladder and go up underneath in the same manner as the dredging apparatus devised by the same inventor.

CALIFORNIA'S CLIMATE.—Mr. B. B. Redding's article on the climate of California, to which so much of our space is devoted this week, ought to be widely circulated at home and abroad. It forms the most accurate and intelligent synopsis of the causes of the varieties of climate experienced in different parts of this State that has ever been published. In fact, there are few competent to handle the subject as Mr. Redding has done, his facilities for obtaining statistics being unexceptional and his interest in the matter great. He has had abundant opportunity for observation from one end of the State to the other, and has spent a great deal of time in collating data, so that nothing like this article has been written in California before. It will form a nucleus, or grand starting point, for the collection of further facts, and we should be pleased to see any comments or further information which it may elicit. We have no doubt that Mr. Redding would be pleased to get the views of others who are interested in the subject and have paid any attention to it. Mr. Redding is a disinterested, public-spirited gentleman, who has greatly benefited the State by his labors as one of the Fish Commissioners, and in many other directions; and that he is a searcher after scientific truths may be seen by reading what he has written on the climate of California.

The accident at the Savage mine this week by which a miner was precipitated down the shaft, and three more came near being killed, is attributed to the engineers being overtaxed by working a 12-hour shift. The cage was drawn up into the sheave although the indicator was all right, showing that it must have been inattention on the part of the engineer. A move is being made to have the hours of labor for engineers reduced.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents—Eds.

From Globe District, Arizona.

EDITORS PRESS:—We had a visit recently from Messrs. Samuel McMasters and I. M. Taylor, of San Francisco, and Mr. C. D. Angell, the representative of heavy operators in the oil regions of Pennsylvania, was here at the same time. After looking around for a few days, these gentlemen joined together and purchased the Byron and Bixby mines—referred to in my letter printed in your issue of December 1st—about seven miles from this place. The lodes alluded to are nearly a dozen in number and each shows a strong out-crop of high-grade chloride ore. The Isabella, one of the series, was incorporated, in your city, in November, and is now being opened by an incline on one side of the vein. This incorporation will be merged in the new company, which, commanding abundant means, will carry on operations in a way to secure large and rapid returns. The old Morrill & Ketchum mill-site has been purchased and it is believed that in about four months a complete quartz mill, with necessary roasting furnaces, can be got ready to go into operation. Mr. Thomas McMasters, one of the best silver mill-men on the Pacific coast, will have charge of the mill, and Mr. H. G. Bixby will carry on the mining work for the new company.

The mines secured by the purchasers are of great value. Even if the ore in sight only goes down 20 feet, not to speak of deep mining, several thousand tons will be obtained at small cost, and it is quite safe to estimate this ore at from \$300 to \$400 per ton, just as it comes from the ground, no careful assortment being necessary. On almost any one of the claims, pieces of ore, coated with horn silver, can be picked up, which will give very high assays.

The new mill will be a "custom" one in this sense. Miners bringing in ore, will have it crushed and sampled in the usual way and be paid for it at fixed percentages, according to the assay. In securing low-grade ores, the mill-manager will be enabled to regulate his weekly yield of bullion by mixing them with the company's rich ores, and miners owning good claims will obtain by their own efforts the means to open them.

A New Discovery.

A young Scotchman, of the name of Watson, who had been two years in the district without finding any claim of value, made a fine discovery a week or two ago. He was hunting deer and got upon a rocky ridge, where he never would have thought of climbing in the hope of finding mines. Following some pieces of rich float, he came upon two lodes, now known as the Etna and Silver Era. The former is a well-defined vein, about four feet wide, with ore that will yield several hundred dollars per ton. The latter is less regular than the former, but it has a streak, 8 to 10 inches wide, which assays over \$2,000 per ton. On the two claims there are several thousand dollars' worth of ore, which the owners can extract with very little labor. A new discovery has been made south of the Miami mine and a rich streak of chloride has been uncovered.

The Great Future of Globe District

Is more and more impressed upon my mind as my knowledge of its immense mineral belt is increased. I have counted at least 55 distinct parallel veins, from 300 to 500 feet apart, which have been traced or are traceable along their strike, for from 10 to 25 miles. Of course these ledges do not all show ore on the surface, but here and there over the entire belt, rich ore, at least, promising ore bodies and indications of such have been found. From three to six lodes seem, in most cases, to come from a common source; that is, two or three pitch westerly and three opposite and parallel to them pitch easterly or toward the others. In such a series there is usually one lode that, in respect to size, walls and quality of ore, looks superior to the others. I have been over a large part of eastern Nevada, and though what I am about to say may offend mine owners in that region, I yet assert, after a careful and very extensive survey of Globe district, that it unquestionably contains within its original limits more valuable silver mines than have been found in that portion of the great basin referred to or ever will be found there. I used to think very bigly of "the great east," and do so still, for it has many excellent mines, discovered and undiscovered; but I am dealing with facts that have been forced upon me, and why should I refrain from expressing a candid opinion, merely because its utterance will offend some man, whose pocket, as a Nevada miner, will be touched if Arizona becomes, as it certainly will become in the near future, the great center of attraction to mining capitalists. One disadvantage this district suffers from now is the immense variety of its ores and the queer looking stuff that at times carries a high percentage of silver. The richer the ore the more singular it looks. For a month at the first, a Nevada prospector, no matter how much experience he may have had there, is incapable of prospecting to advantage here. The kinds of quartz he selects are often barren and those he casts aside as worthless are rich.

So when experts arrive, they are really not fully qualified to judge of ores by sight and must depend, in a great measure, on assays, and if they themselves select the ore to be tested, they are likely to get very poor returns.

Good Developments.

The Metamora mine, a San Francisco incorporation, is being steadily opened, with very promising results. The vein is well defined and is likely to supply abundance of good ore, once it is opened below the water line. A new strike has been made in the Sherman, which is likely to add considerably to the value of that property. I am informed that McMillan, the locator of the Stonewall Jackson, has found a fine streak of chloride and native silver in the Hannibal lode, which he still owns, but I have not seen it.

The Weather

Has been quite cold of late for this Territory, the thermometer touching 19° this morning. There has been one fall of snow, with from two to 10 inches on the ground, according to altitude; but, except in shaded spots, it melted off in a day.

J. D. E.

Globe City, Arizona, Jan. 3d, 1878.

Heath District, Idaho.

EDITORS PRESS:—Reading an article in the PRESS of Dec. 29th upon the "Smelting Ores" reminds me that some account of Heath district in this county (Ada county) would be interesting to your readers. Heath district is situated on the head waters of the Weiser and other streams that put into the Snake river and is distant from Boise City about 80 to 100 miles.

This range of country is seamed with immense ledges of base metal ores. The most prominent is a ledge of galena over 60 feet in thickness and contains galena that runs from 70% to 80% pure. There is some silver in all these ledges and when reduced to bullion is worth from 75 cents to \$1.25 per pound. I have seen it reduced in a blacksmith's forge and run into bullets. There are large numbers of these ledges, some of which are located, but the parties claiming them are farmers living in the adjacent valleys and do not think there is any means within their reach of bringing them into available condition. There is an immense ledge of copper ore which is very rich and some effort will be made the coming season to develop it.

Here is surely a fine field for prospectors for base metal ores, and being located amidst the finest forest of timber with plenty of water and fine agricultural lands close at hand would be a very cheap locality for working such ores. At present want of railroad facilities are a great drawback to the working of such ores, but within a short time the Portland, Dalles and Salt Lake road will be constructed, which will pass along the very base of this entire range of mountains and through these fine valleys, and will enable capitalists to open these mines as cheaply as any in the country. At present the cost of freight from the railroad is from 2½ to 3½ cents to Boise City and from here to those mines would be from one to two cents more. Thus you see shipping base metals at present is rather expensive. But the immense natural resources of this interior country will soon bring railroad facilities.

A. B. ROBERTS.

Boise City, Idaho, Jan. 7th.

The Bonanza.

A Year's Work in the California Mine.

The annual meeting of the California mining company was held on Wednesday, the 16th inst. The following financial statement shows the condition of the affairs of the mine:

RECEIPTS.	
Bullion on hand last annual statement.....	\$ 1,342,967 93
Cash on hand last annual statement, San Francisco.....	1,054 50
Cash on hand last annual statement, Virginia City.....	354 15
Samples on hand last annual statement.....	2,228 68
Gross product of mine since last annual statement.....	18,924,850 27
Ore sales.....	25,832 15
Total.....	\$20,297,317 67
DISBURSEMENTS.	
Overdraft Nevada Bank last annual statement (since paid).....	339,637 62
Dividends, 9 to 21 inclusive.....	14,040,000 00
Reduction of ore.....	2,220,007 87
Supplies in Virginia.....	315,017 35
Salaries and wages, Virginia.....	788,012 00
Salaries and wages, San Francisco.....	10,450 00
Taxes paid in Virginia.....	461,637 93
Taxes paid in San Francisco.....	991 55
Legal expenses, Virginia.....	70,426 20
Legal expenses, San Francisco.....	57,172 86
Interest and exchange, Virginia.....	9,156 01
Interest and exchange, San Francisco.....	78,811 94
Assaying.....	180,461 32
C & C shaft.....	53,298 12
Virginia office expenses.....	131,000 00
Surveying.....	2,927 05
Team account, hauling.....	780 25
Discount on bullion.....	1,039,947 18
Refining.....	207,355 38
Bullion freight.....	70,315 26
San Francisco office expenses.....	4,020 48
Books and stationery, San Francisco.....	1,500 00
Advertising and printing.....	337 50
Cash in Nevada Bank.....	202,366 24
Cash on hand, San Francisco.....	701 45
Samples on hand, San Francisco.....	373 34
Samples on hand, Virginia.....	2,337 50
Cash on hand, Virginia.....	1,298 31
Total.....	\$20,297,317 67

When the customary resolution, complimenting the Board of Trustees and endorsing their acts for the year, was proposed, Mr. S. P.

Dewey objected and there was some discussion, but the resolution was finally passed. The following is the

President's Report.

To the stockholders of the California mining company: The mine has yielded during the year ending December 31st, 1877, 217,432 tons of ore. Of this ore, 213,683 tons 150 pounds have been reduced, yielding bullion of the value \$18,924,850.27. The value of the gold in the bullion was \$9,386,745.47, and of the silver, \$9,538,104.80.

This is a splendid showing for the year and the dividends paid to the stockholders since the annual statement, amounting to the sum of \$14,040,000, are the tangible proofs of it.

The tax on bullion, levied by the State of Nevada, is onerous. We have paid taxes during the year amounting to the sum of \$462,629.78.

The discount on sales of silver bullion is another material item of expense, amounting for the past year to \$1,039,947.18.

The annual report of the Superintendent is very full and complete, giving detailed statements of the workings on the different levels of the mine; accompanied by full and accurate maps, showing at a glance the progress made in developing the mine; and I deem it proper to express, in this public manner, the thanks of the company to its Superintendent, James G. Fair, Esq., for the very able and intelligent manner in which he has discharged his duties.

And I feel I should not close this report without congratulating the stockholders upon the very prosperous year just closed.

GEO. WALLACE, President.

Secretary's Report.

President California Mining Company:—Here with I submit my annual report of receipts and disbursements for the fiscal year ending January 16th, 1878. Accompanying my report will be found a statement compiled by Mr. Taylor, chief clerk at Virginia City, showing the cost of every article used at the mine, and an estimate of what each ton of ore costs up to the time the bullion is shipped to San Francisco. In order to find what it costs to reduce each ton to money, I have made the following calculation of expenses incurred in San Francisco:

Discount on bullion.....	\$1,039,947 18
Refining.....	207,355 38
Bullion freight.....	70,315 26
Interest and exchange.....	78,811 94
Taxes.....	991 55
San Francisco office expenses, including stationery, salaries, etc.....	16,323 98
Total.....	\$1,413,745 50

This amount divided by the number of tons worked (213,683), gives a cost of \$6.61 6-10; cost per ton in Virginia, \$19.08 8-10; total cost per ton, \$25.70 4-10.

C. P. GORDON, Secretary.

We take the following from the very elaborate

Superintendent's Report.

Geo. Wallace, Esq., President of California Mining Company—Dear Sir:—The California mining company has yielded, during the year ending December 31st, 1877, 217,432 tons of ore. There remained on hand on the 1st day of January, 1877, in the ore houses and at mills, 1,260 tons and 300 pounds, making a total of 218,692 tons and 300 pounds. Of this ore, 213,683 tons and 150 pounds have been reduced, leaving on hand in the ore houses and at mills, 5,009 tons and 150 pounds, valued by assay at \$518,431. The ore reduced has yielded bullion of the value of \$18,924,850.27, or \$88.49½ per ton—this yield being 73 3-10% of the assay value of the ore. The value of the gold in this bullion was \$9,386,745.47, and of the silver, \$9,538,104.80.

After paying the expense of transportation and the heavy discount which is exacted on silver, the net proceeds realized from the bullion by the time it has become converted into money, amount to considerably less than the stamped value of the bars.

In reviewing the operations in this mine for the past year, that there may be a full understanding of their nature and extent, I will describe what work has been done on each particular level and the results.

1400-Foot Level.

Considerable work has been done on the 1400-foot level and on the levels above it, but not enough to determine whether ore exists or not in either of them. The drifts and crosscuts heretofore run are badly crushed and require much labor to place them in order. This should be done and the ore vein thoroughly crosscutted, and the value of the ore which may be contained therein be determined within the present year.

1500-Foot Level.

From the 1500-foot level much ore has been taken and much still remains on the east side of the stope which have been worked. Its quality, so far as it has been developed, is of low grade, excepting a small body lying south from crosscut No. 4 and on the west of the main ore body. This body is but 14 feet in width and between 60 and 70 feet in length.

In the northern 200 feet of the mine, on this level and the level above, our drifts and crosscuts have not been extended to the east boundary of the ore body, but have terminated in a vast body of poor quartz, of too low a grade to justify extraction.

We are now engaged in running a drift from the C. & C. joint drift on this level, so far, 136 feet, and its whole length, when it intersects the ore stope, will be 371 feet. From this drift we can develop this body of quartz cheaply

and avoid the crushing ground which adjoins the settling ore stope.

The main north drift, which extends from the main shaft to crosscut No. 4 on this level, also crosscuts Nos. 1, 2, 3 and 4, are in fair condition, but they are kept so at continual heavy expense on account of the constant settling and creeping to the east of the ground near to and west of the ore stope, through which the drift and these crosscuts pass.

1550-Foot Level.

From this level a vast quantity of ore has been taken, of high grade. On the sill floor the ore has extended the whole length of the mine, excepting a few feet next to the northern boundary. The same may be said of the second floor and upward, excepting 10 feet next to the north line. The part excepted carries ore of low grade. The ore body on this level, at the widest point, is 162 feet in width. To the east of this ore body there is a very large body of low-grade quartz, similar to that on the levels above, which has not been developed, the crosscuts not having been extended to the east wall of the ore vein. From all appearances the largest portion of the bulk of ore on this level has been taken out. There still remains considerable ore of good quality and a large quantity of medium grade.

We are now running a large working drift on the west side of the ore body in the solid west wall. This drift will extend the whole length of the mine, connecting with the main shaft on the south and with the Ophir mine on the north. All the crosscuts will be continued to this drift, and from it access will be had to all parts of the level.

This level is well ventilated by winzes sunk at intervals in the vein, connecting with the level above and with the level below.

The east clay of the ore body has been followed northeast from No. 3 winze 120 feet. Lying against this east clay is an east seam of ore, 18 feet in width, of fair quality. This ore seam gradually widens going north. It is east of what has heretofore been supposed to be the east clay of the ore body.

1600-Foot Level.

From this level 105,723 tons of ore have been extracted, and all of this has been hoisted through the Ophir shaft. The ore breasts show a large quantity of good ore remaining. The sill floor has been extended from the northern boundary south to within 240 feet of the south line of the mine. This 240 feet of the ore body is untouched between this level and the level above, except where it has been penetrated by No. 3 winze, which passes through it. This winze shows good ore.

The sill floor between winzes Nos. 5 and 6 discloses a poor spot extending across the vein. Its length is 50 feet on the east side and nearly 40 feet on the west side; but the second floor and all the floors above show continuous ore over this poor section. Winze No. 5 has been sunk 240 feet below this level and connected with the 1650, 1700, 1750 and 1840-foot levels. These winzes are large and have each two compartments, with strong air-winding engines placed upon them, and they are indispensably necessary for the transmission of men and materials and for the free passage of air from level to level.

A large drift connects with the Ophir shaft through which the ore is run out to that shaft and from which we obtain our main supply of pure air. A joint incline winze has been sunk from this level to the 1840-foot level. In its descent it connects with the 1700-foot level and ventilates that level. It is heavily timbered and is designed for a chute for the ore of the 1700-foot level. A large lateral drift is being run the whole length of the mine.

The east wall has not been reached in any of our crosscuts in the northern 400 feet of the mine on this level. These crosscuts all terminated in a large solid body of poor quartz.

1650-Foot Level.

The main drift which leads from the Consolidated Virginia and California joint shaft on this level has been carried forward to the ore vein.

A joint crosscut (No. 1) has been extended west across the vein to the Consolidated Virginia main shaft—a distance of 270 feet, and ore is now being hoisted through this shaft from this level.

This level has been partially opened by a main drift which runs in the middle of the vein for the whole length of the mine—except 40 feet in which the drift is now being advanced. This drift, as it passes north, connects with winzes Nos. 3, 4, 4½, 5 and 6. Crosscuts Nos. 2, 3, 4, 4½ and 5 have been extended across the ore vein; each one touching, as we suppose, the east clay and the west clay. Some of these crosscuts pass through fine ore, and some through worthless matter.

The sill floor of the stope opened on the south line extends north 105 feet, passing on each side of the horse. The ore again unites at No. 3 winze, the horse giving out at this point. Here we have opened a small sill floor 30 by 30 feet and 12 feet in height, and the ore here is of excellent quality. The ore body again splits in going north, one part of it hearing to the northeast and the other part to the northwest, under the ore body worked on the level above.

The main north drift in the ore body has already required to be enlarged and timbered five times, and is now in bad condition. To save the great expense of thus maintaining drifts in the ore vein, a lateral drift has been started from the main shaft and will be run north in

Continued on page 58.

MECHANICAL PROGRESS.

French Rewards for Inventors.

The French Society d'Encouragement offers, as is its annual custom, a number of prizes in the domain of the industrial arts. In the list of desiderata we note the following: Small motor for domestic workshop; improvement in manufacture of flax and hemp; deadening of shocks caused by block hammers; heckling short textile fibers; instruments of automatic topography (3,000f.); file-cutting machine; improvement of steam engine; new alloy useful in the arts; artificial manufacture of graphite for crayons, manufacture of black diamonds, industrial use of oxygenated water; theory of steel, based on precise experiments (6,000f.); rendering tissues and wood unflammable; sulphuric acid without arsenic, extracted from pyrites; chemical transformation, giving a useful natural product (4,000f.); cast steel or iron improved by alloy with another metal (3,000f.); economical preparation and use of ozone; fixation of nitrogen of the air in nitrates, cyanides or ammoniacal salts; artificial production of fatty bodies (4,000f.); disinfection of gas-purifying cases; permanent disinfection of water closets (2,000f.); rapid dessication of wood; means of preventing the adherence of soot in chimneys; food preservation; application of spectrum analysis in industry; small apparatus giving high temperatures; application of the endosmos of liquids and of gases; destruction of center of attack of phylloxera; utilization of land by fruit trees; distribution of pulverulent manures; employment of photography for typography. The awards are to be made at sundry dates between now and 1882.

PNEUMATIC TRANSMISSION IN GERMANY.—We have alluded to this subject before and reports now are that its success is great. The pneumatic post system, or "blow post" is in operation at Berlin and is being considerably extended. The system when complete will comprise 26 kilometers of tubing and 15 stations. The tubes will be of wrought iron, having a bore of 65 millimeters, and they will lie about one meter below the surface of the ground. The exhausting machines and apparatus required for working the Berlin system are situated at four of the 15 stations. Both compressed and rarified air, or a combination of the two are employed in propelling the "carriers," or boxes, into which the telegrams or letters are placed, and steam engines of about 12-horse power are used in condensing and rarifying the air. Each of the four main stations has two engines, which drive a compressing and an exhausting apparatus, and large containers, or reservoirs, are used for the condensed or rarified air. The tension of the condensed air is about three atmospheres, and that of the rarified about 35 millimeters of mercury; and the former heated to 45° C. by the act of compression, is cooled in the reservoirs which are surrounded with water. The letters and cards which have to be forwarded are of a prescribed size, 20 being the complement assigned to each "carrier." From 10 to 15 carriers are packed and forwarded at a time—a sort of pneumatic "train," in fact; and behind the last vehicle is placed a box with a leather ruffe, in order to secure the best closure of the tube. A train is dispatched every quarter of an hour, each of the two circuits or routes into which the system is divided being traversed in 20 minutes, including stoppages. A "blow post" letter appears to cost 3d. in Berlin, or about one-fourth of the cost of a telegram; and the average time of delivery in any quarter of the city is stated to be one hour.

LOSS FROM HEATED BEARINGS.—In a paper read before the Manchester Mechanical Society Mr. W. H. Bailey, on "Lubricants," he gives an idea of the waste from heated bearings. He said that when friction was produced heat was lost, and all energy thus wasted passed away in that heat which might be measured and valued with nearly as much facility as any article of commerce. From this knowledge they might gather, when they applied it to workshop economy, that if a pedestal or bearing became so hot through friction as to cause one pound of water to be raised 1° Fah. in temperature in one minute, heat had been lost equal to that which would be caused by a weight of one pound falling through a space of 772 feet, or heat had been lost which would lift one pound weight 772 feet; if they applied those illustrations still further, and imagined 41 pedestals or bearings losing heat by friction in a similar manner, they might inform themselves that they were losing one-horse power, and if they knew from their books what their coal cost it would take very little trouble to give them the exact cash value of the friction and destructive action. The maximum of pressure that solid lubricants would bear without destruction was unknown. For steel surfaces, lubricated with best sperm oil moving slowly, 1,200 pounds pressure per square inch of bearing surface has been found permissible. Under the pivots of swinging bridges several thousand pounds per square inch had been found to work, for iron journals 800 pounds per square inch should not be exceeded. He said that the oil which allowed the greatest heat to accumulate with the fewest revolutions, must be a bad lubricant.

WROUGHT AND CAST-IRON BRAKE SHOES.—A correspondent of the *National Car Builder* records the following experiment: Wishing to test the durability of wrought-iron as compared with cast-iron, when used as a brake-shoe, I had a wrought-iron shoe made of the usual form, and applied it to the brake-head of a brake beam in a four-wheel truck of a baggage car, and at the same time used a cast-iron one at the other end of the beam, putting them into service October 25th, 1876. The weight upon each wheel when the car was empty was 4,720 pounds, and when in service the average was about 5,800 pounds—the power used being the Westinghouse air-brake arrangement. The weight of the wrought-iron shoe when now was 14 pounds, and that of the cast-iron one at the other end of the beam 18 pounds. The car was then run between Louisville and Indianapolis until December 15th, 1877, making a total of 82,000 miles, at an average speed of 26 miles an hour, including stops. The wrought-iron shoe, when taken out, weighed eight pounds, having lost by wear six pounds in making the aforesaid mileage. In the meantime five different cast-iron shoes were put in and worn out, excepting the last one. The total weight of these when put in was 90 pounds, and the total weight when taken out was 46 pounds, showing a loss of 44 pounds by wear, or a little more than seven times as much as in the case of the wrought-iron shoe.

A STEAM SLED.—Mr. Cartmel, the English arctic explorer, from his experiences during the expedition of Capt. Nares, came to the conclusion that sledging by manual power was a hopeless method of attempting to reach the north pole, and since his return has been busily engaged in devising a steam sledge for that purpose. This contrivance, as described by the inventor, consists in its general outlines of a flat-bottomed boat with two stern wheels, the midship cross sections being a parallelogram. It would be constructed of steel plates lined with wood, perfectly rigid, and capable of standing the roughest usage. The boat-sledge, as it may be termed, would be highly polished, so as to minimize friction, whilst the how would be stayed and strengthened to the fullest extent, so as to resist concussions. Of course the steam power is intended to be concentrated as much as possible, whilst the steering wheels could be driven directly from the crank shaft.

DAMASCUS BLADES.—There have been some curious features connected with the sword manufacture in early times, says an Eastern traveler. The Damascus blades and the Toledo blades have, each in its own particular sphere, acquired great fame for their excellence; the keenness of the edge and the extensive and perfect elasticity having been carried in them to the utmost point. We have all read of Orientals wearing their swords twisted round their waists, or even coiled up in their turbans, so great was their elasticity; and swords have been made so keen as to cut a silk shawl in two while resting lightly on the edge. Such, at least, have been the reported wonders; but the Easterns may probably in this, as in many other matters, embellish their stories a little.

OIL PIPES IN RUSSIA.—The Russian capitalists who are working the petroleum wells are now laying down iron pipes from the wells to the Black sea coast, where ships will be loaded by pneumatic pumps. It was recently reported that an American company had petitioned the government for a concession to work all the petroleum wells in Asiatic Russia. It was pointed out to the authorities, however, that the Americans are aware that the Russian petroleum will enter into serious competition with American, and that this was an effort to paralyze the trade.

ELECTRIC LAMP LIGHTING.—The *Iron Age* says that the days of the lamplighter are numbered, and the time is at hand when he will exist only in story. Electricity is certain to take his place, because it can work more cheaply. It has been tried for the purpose of lighting and extinguishing 220 street lamps in Providence, R. I., scattered over a district nine miles long. One man attends to the whole business, and does it in 15 seconds. The method has now been on trial for some months, and a saving of \$10 per lamp per year is reported.

DUTY OF SCIENTIFIC MEN.—Prof. Pettenkofer, at the recent meeting of the German Association of Naturalists at Munich, thus spoke of the duty of scientific investigators: "Natural science has but to look for facts and truths, and need never busy itself about the immediate practical application of what has been found, because for them alone it deserves the sympathy of the entire civilized world and the means necessary for its culture and development."

STEEL COMPRESSED BY STEAM.—A gentleman who has just returned from a tour among the Pennsylvania rolling mills, tells the *Iron Age* of witnessing a very interesting process by which steam pressure is applied to Bessemer steel while in the molds, and thus far with excellent results, considerably reducing the bulk and improving the texture.

LEMON WOOD.—A traveler writes: "When in Rome, a few years ago, I was shown some work made out of wood of the lemon tree that was considered almost as good as if made from box."

SCIENTIFIC PROGRESS.

Change of Habits in Toads.

While prosecuting the field work as Paleontologist of the United States Geological Survey of the Territories, under the direction of Prof. F. V. Hayden, in Colorado, during last season, Dr. C. A. White had the opportunity to make some very interesting observations in relation to a change of habits in the common toad (*Bufo Americanus*). The district referred to is that portion of the great plains which lies immediately adjacent to the eastern base of the Rocky mountains, and which is traversed by the South Platte river and its tributaries there. The valleys of these streams are broad and shallow, and the streams, heading in the immediately adjacent mountains, have an abundant flow of water; so that large tracts of land in all those valleys have been brought under cultivation by irrigation. Irrigation is necessary in all that region, for it lies within that portion of the United States domain upon which the annual rainfall is insufficient for the purposes of agriculture.

With the irrigation of the land, came increased and perennial vegetation; with that came increased insect-life, and with that an increase of birds and toads. The irrigating ditches are everywhere numerous, and during the season of growing crops they are frequently visited by men to regulate the flow of water to the land. This, and other circumstances, disturbs the toads, that frequent the shade of the herbage which grows upon the borders of the water. It is no uncommon thing for toads, as well as frogs, to jump into the water when disturbed, but the habit of the former is to make a shallow dive, rise immediately to the surface and swim upon it by a sweeping curve to the shore again, not resting until the brink is gained, upon which they tarry awhile before coming upon the land. Frogs, on the contrary, when disturbed, make a strong dive directly for the bottom, upon which they lie prone, with the legs flexed against the body, and into the mud of which they settle themselves a little. Here they remain, and exhaust the patience of one who may attempt to wait for them to rise. Now the toads in this irrigated region have adopted precisely these common habits of the frogs, when disturbed upon the borders of the ditches, as Dr. White repeatedly witnessed. This is regarded as the resumption of an instinctive trait that has been potentially transmitted from a former race of anouans that were less differentiated than frogs and toads are now from each other; and that the lately introduced change of physical conditions in that region has caused the toads there to resume habits which the frogs have never abandoned.

Chance for Midnight Battles.

"The troops retreated under cover of the darkness" is a sentence which bids fair to go out of use in the history of future battles. The electric light promises to make fighting at night as practical as fighting by day—as though there could not enough bloodshed be enacted while the sun is above the horizon. A number of interesting experiments have been recently carried out at Metz by a committee of engineers and other officers appointed to investigate the practicability of employing electric light during siege operations, and to suggest any modifications which it may seem expedient to introduce in the apparatus at present in use. According to the *Pall Mall Gazette*, on the night of October 20th, Forts Frederick, Charles and Alvensleben were illuminated by throwing the electric light upon them, when it was found that at a distance of from two to three kilometers, not only buildings but also individual men could be plainly made out. On the night of the 27th of October the electric apparatus was arranged on the exercising ground outside the Chamber gate, and the light directed upon a row of targets. Fire was then opened against these latter by a squad of riflemen, and the practice made was nearly as good as that recorded on ordinary occasions when firing by day—a result which was considered exceedingly satisfactory, as a thick mist prevailed at the time, and materially interfered with the action of the light. Altogether the committee concluded that the electric light may in future be employed with advantage not only in siege operations, but also during outpost duty and engagements at night.

The London *Times* says that the parachute light, introduced into the service as a means of revealing the enemy's position and movements at night, is to be superseded by the newest description of star shell. The parachute light, which was invented by Colonel, now General Boxer, when superintendent of the Royal Laboratory Department, Royal Arsenal, Woolwich, is somewhat expensive in manufacture and rather cumbersome in carriage, as it forms, when closed, a large shell, expanding into a huge umbrella, 15 feet high, when opened, the cup of composition which is suspended being designed to burn four minutes and a half. The star shell is much smaller and more portable, and of comparatively trifling cost. It can be fired into the air from a mortar at the required angle to show the enemy's works, and burns with a brilliant light for about half a minute, long enough to take an observation and lay a gun, but not long enough to allow an adverse wind to bring the light back over the firing point, and so turn the advantage in favor of the enemy.

A Monstrous Geologic Reptile.

Prof. O. C. Marsh, in the last number of the *American Journal of Science* states that the museum of Yale college has recently received the greater portion of the skeleton of a huge reptile, which proves to be one of the most remarkable animals yet discovered. It was found on the eastern flank of the Rocky mountains, in beds which are regarded as corresponding nearly to the Wealden of Europe, and which may be classed as upper Jurassic. The remains are well preserved, but are embedded in so hard a matrix that considerable time and labor will be required to prepare them for a full description. The characters already determined point to affinities with the Dinosaurs, Plesiosaurs, and more remotely with the Chelonians, and indicate a new order, which may be termed *Stegosauria*, from the typical genus here described.

In this specimen, some of the teeth preserved have compressed crowns, and are inserted in sockets. Others are cylindrical, and were placed in rows, either in thin plates of imperfect bone or in cartilage. The latter are especially numerous, and may possibly prove to be dermal spines, having all the essential characters of teeth, as in some fishes. The vertebrae are biconcave, their neural arches being cooified with the centra, and the chevrons articulated. The limb bones indicate an aquatic life. The body was long, and protected by large bony dermal plates, somewhat like those of *Atlantochelys* (*Prostostega*). These plates appear to have been in part supported by the elongated neural spines of the vertebrae. One of the large dermal plates was over three feet (one meter) in length.

The present species was probably 30 feet long, and moved mainly by swimming. For its discovery science is indebted to Prof. A. Lakes and Engineer H. C. Beckwith, of the United States navy, who found the first remains in Colorado near the locality of the gigantic *Atlantochelys montanus*, and in essentially the same horizon.

A PARASITIC CATERPILLAR.—We read that Mr. J. C. Bowring has discovered a curious moth, which in the caterpillar state is parasitic on the Chinese lantern fly (*Fulgora candlearia*). The caterpillars are very short and thick, fleshy and about half an inch in length, and, when fully fed, covered with a "cottony coat," which makes them resemble certain bark lice. The pupa is covered by a thick cocoon, and the time in which it remains in the pupa state is very variable; in one instance only nine days, in another "during our cool season"—upward of 12 months. The caterpillars are themselves infested by hymenopterous parasites. Prof. Westwood, who describes the insect in the "Transactions of the Entomological Society of London," under the name of *Epiphyrops anomala*, thinks that the caterpillar feeds upon the waxy secretion of the fulgora. The moth is referred to the arctians by Prof. Westwood; but while it is probably one of the bombycidae, we think it is wrongly referred to the "arctiids."

SCORPIONS AS STRIDULATORS.—While many of the higher insects, as grasshoppers, katydids, crickets, cicadas, and even moths, produce a creaking or stridulating noise by rubbing one part of the body on another, it has hitherto been unsuspected that scorpions have the same faculty. Mr. J. Mason Wood, however, has recently announced the discovery of stridulating organs in the scorpion. After noticing this while dissecting a specimen, he was able to confirm it by experiments on living examples. By placing two large scorpions face to face on a light metal table, and exciting them, they began to heat the air with their palps and simultaneously to emit sounds which were most distinctly audible, not only to himself, but also to the bystanders, above the clatter made by the animals in their efforts to get free, and which resembled the noise produced by continuously scraping a piece of silk woven fabric.

BALLOONS AND SCIENCE.—In conversation with a St. Louis newspaper reporter a few days ago, Prof. Wise, the aeronaut, expressed his views of the possibilities of ballooning, as follows: "Balloons may be made of boiler iron if built large enough. You know it is the hattle of cubes and surfaces. When the surface is doubled the cube is quadrupled, and a balloon of 400 feet diameter of copper boiler plate will lift up a man-of-war ship and sail away with it. With such a balloon stocked with bombs and other munitions of war, think what consternation could be carried into a besieged camp. But the mission of the balloon will be more for scientific explorations. That overshadowing science called meteorology will yet provide its definition in the use of the balloon."

BISMUTH.—No country is so rich in bismuth ores as Bolivia. The mines which yield the largest amounts are those of Tazna, Chorolque, Oruro, and some others in the neighborhood of Guaina-Potosi, Sorata, etc. The bismuth is usually accompanied by tin, frequently by gold and silver. The presence of bismuth has been discovered in several localities of Peru and Chile, but in quantities comparatively very limited.

A NEW THEORY OF THE NATURE OF WATER.—M. Maiche in *Les Mondes* propounds the theory reached after numerous experiments that water is simply hydrogen plus electricity, or oxygen minus electricity; or, in other words, that normal electrified hydrogen constitutes water, and that normal diselectrified oxygen produces the same.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

A GOOD FIND.—Amador Ledger, Jan. 19: One day last week Marion McCarthy, of Big Oak Flat, while prospecting on the Oak Flat side of the Deer Flat divide, had the good fortune to find \$500 in gold dust. The precious metal was in a "heap," which leads to the supposition when placed there it was in a sack, which had rotted and disappeared by the action of the elements. Let that be as it may, it got there, young McCarthy found it and will have the benefit that amount of gold may do in these hard times.

The first pay-day of the Lincoln company since the resumption of work came last week, to the joy of all hands. The men received their money in checks—a very handy mode of paying.

The first clean-up of the Lincoln mill was made last week. The yield of bullion, we understand, is considered satisfactory.

OPERATIONS at the Moore mine were suspended Tuesday and Wednesday on account of inclement weather.

The flume of the American Flat gravel company, at Fiddletown, was completed last week. It is the best piece of work of the kind in the county. As the heavy rains of the past week have probably started ditches, hydraulic operations will be started immediately.

PLYMOUTH.—We learn that a San Francisco company have purchased the Baldwin mine, near the Central, and will immediately place a gang of men at work to develop it. Quartz mining with us has taken a new start, and every indication favors the opening of several mines in this section this season.

The north shaft of the Phenix is down 1,200 feet. Good ore, showing free gold, has been struck at that depth, which is the first time, we are informed by Engineer Easton, that ore has been struck in sinking that shaft. They are now drifting in the north shaft and sinking the sump.

BUTTE.

BIG BAR.—Oroville Mercury, Jan. 18: The rain has furnished the Big Bar mining company with all the water that it wants for mining purposes. Two chiefs are at work with a full crew of men. Everything is fitted up in the best possible order for working. This company claim that the mine is one of the richest in the State, and they will now have an opportunity to demonstrate it.

LAVA BEDS.—The Lava Beds below town are yielding about \$30,000 each month, though some months the yield reaches the snug little sum of \$100,000. These mines are worked chiefly by Chinamen. There are 10 or 12 steam engines at work in different parts of the Lava Beds pumping out water. About 1,500 men are at work. With the aid of the steam pumps they can get down further, and they find the gravel all the richer.

ANOTHER SHAFT.—Captain Ferguson, of San Francisco, has a crew of men at work on the bluff near the shaft of the Oroville gravel mining company, and are hard at work going down into the earth in hopes to reach the bedrock. They have put some excellent machinery on the claim for pumping water and raising the earth. This shaft, together with that of the Oroville company, will thoroughly prospect the bluff.

CALAVERAS.

PLENTY OF WATER.—Calaveras Chronicle, Jan. 19: For the first time this season the ditch carrying a full head of water, and miners all along the line have been prompt in making use of it. Operations are now being vigorously pressed in all the claims in this vicinity, and the winter's mining campaign may be said to be fairly opened. Within a radius of two miles of Mokelumne Hill there are no less than seven great gravel mines, all of which are now being actively worked. Querel & Co., Duryea, Brown, Veith, Moser & Co., Emerson and Cook & Co., are proprietors of the properties, and there is not a more energetic septette of miners in the State. With the resumption of mining operations we can confidently count upon the departure of "hard times."

NEW MINING ENTERPRISES.—Several new mining enterprises have been instituted in this vicinity lately. Sliter & Co. are opening an extensive gravel claim in Old Woman's gulch, with good prospects of success. They have a large force of hands at work. Kelly & Co. are actively engaged opening a new mine near Sport Hill, and several other companies are prospecting different localities. This is going to be a lively season in a mining point of view.

UPPER COUNTRY JOBS.—At West Point the Champion still is sinking, development continuing of the most satisfactory character. Halsey & Witford are to take 200 tons of ore from the San Francisco mine. The new mill being erected at the Granite mine is nearly completed. The Enterprise Con. mill will be started up immediately. There is upwards of 200 tons of rich ore on the dumps. Everything is progressing favorably at Mosquito. Work is being pushed on all the mines with fully as good results as at any previous period in the history of the district. The San Bruno hoisting works will be in operation in a few days.

INYO.

CERRO GORDO.—Inyo Independent, Jan. 19: The Beaudry furnace of the Union Con. com-

pany is making a steady output of 125 hars per day of probably the richest hase bullion now produced on the coast, mainly from high grade silver ore coming from the San Felipe. The lead mines yield only sufficient ore to furnish the necessary flux and keep the one furnace in operation. In the new shaft drifting is in progress both from the 700 and 900-ft levels, to strike or run under known bodies of ore in the Union and Santa Maria. Everything about the works is running admirably.

BULLION SHIPMENTS.—Coso Mining News, Jan. 19: The Sheldon, on last Sunday, shipped its first bullion, being a bar weighing 76 pounds. We did not learn its value, but it is reported to be about one-half gold, which would make quite a respectable shipment for a five-stamp mill, just starting up and running but a short time. The Emigrant company, on the same day, made its usual shipment of 87 pounds, valued at \$1,650, and on yesterday shipped 80 pounds more, valued at \$1,500; total for the week, \$3,150. As there are 80 tons of first-class ore on the dump, the mill running all right and plenty of good ore in sight in the mine, regular shipments may be expected for a long time to come.

NEVADA.

SWEETLAND.—Grass Valley Union, Jan. 20: Geo. D. McLean, of Sweetland, was in town yesterday. He reports the storm and rainfall a good thing for his section of country, to a certain extent, but there was not enough of it to keep the gravel mines going for the season. Most of the gravel companies have commenced work, but not all of them. More water is wanted, which is very likely to come, now that the storm-kind has got his hand in.

SPLendid rock continues to come from the Centennial mine. It is estimated at \$100 per load.

The Shamrock mine, near Forest Springs, has been milling good pay rock for some time.

The roads are not in good condition, but the quartz teams are kept busy hauling rock to the custom mills.

The heaviest rain of the season fell in Nevada county, yesterday. It came in with a bluster that meant business, being preceded and accompanied with a southwest wind, which gave things a general shaking up. Trees bent before the blast, casements rattled and buildings trembled to their foundations, but they were sounds of melody to many an anxious mine owner, who has stood idle all winter, by his claim waiting for water, which seemed as if it would never come. It was cheering to hear the congratulations exchanged on all sides, everyone appearing as happy as if they had struck a bonanza. It was a bright day in our weather calendar and a hopeful one for the mining industry of this county and doubtless of the whole mining region of the State.

STRUCK GRAVEL.—Nevada Weekly Gazette, Jan. 19: One of the river mines, below Smartsville, is down near 40 feet with its shaft and last Sunday morning struck hard gravel, with indications of being near bedrock. They are washing the gravel coming out of the shaft through sluices and taking out some gold. The prospects are that on the bedrock they will find good pay gravel.

The Rocky Bar mine is doing splendid. They have taken out about 150 loads, that will average over \$50 per load. They will soon have machinery erected on the mine, which will enable them to take out more rock.

The miners are happy now on account of the heavy rain that fell this week. They hope it will continue to rain for one month, so that they can start to work their placer mines. It will make money more plenty, then everything will brighten up and business will be more lively in this county.

PLACER.

RAIN.—Dutch Flat Forum, Jan. 17: It commenced raining here at midnight on Monday, and with slight interruption has continued up to our going to press. With the amount of water already fallen during the storm and the prospect we have of more, we hope, next week, to be able to report a number of our mines busy at work.

BLAST.—A blast of 500 kegs of powder was fired in the Baker mine, last Saturday, doing splendid execution. On Tuesday last, a three-ton blast of powder was fired in the Franklin claim, which also did good work.

The rain storm at the Flat was quite heavy and it is expected that a considerable number of miners will be ready to start up at once.

MICHIGAN BLUFF.—Cor. Placer Herald, Jan. 19: Col. Keown, of the Hazard mine, has got some good prospects lately and is now prosecuting his work vigorously. The Hidden Treasure and Weske mines are both paying well at present and each mine employs a great number of men, and there are but few other mines in this immediate neighborhood doing anything at present.

PLUMAS.

NORTH FORK ITEMS.—Cor. Plumas National: The Carriboo ditch broke last week; about 100 feet slid off. The upper bank broke off for several feet and our little friend, Geo. McGranahan, says he thinks the whole mountain would have slid off but for "scarcity of dump," although there is some 2,000 feet between it and the river. The boys who leased the Dutch Hill tunnel are doing well, making an average of \$6 per day to the hand. The Sunnyside boys are busy pegging away, with very fair prospects ahead. The new tunnel the company are running is progressing splendidly. It is in something over 500 feet at present. The Meager

Gravel company have their claim all fitted up and are now waiting for water.

SHASTA.

FURNACEVILLE ITEMS.—Cor. Redding Independent, Jan. 17: The Afterthought is thundering away, night and day, and with success beyond expectation. I was in the office a short time ago and saw a beautiful sight consisting of several silver bricks. The fact of the wealth of the district is, fully established, other works will be erected early in the spring. The sulphur fumes arising while working, became so offensive and unbearable to the men that flues had to be built to convey the nuisance off. Heretofore the company have had considerable trouble in the working, on account of the large amount of copper obtained; to obviate this a certain amount of limestone is put in the batteries with the ore, and the change in the appearance of the bullion is truly astonishing, the bricks looking almost like refined silver.

SIERRA.

GOOD ROCK.—Mountain Messenger, Jan. 19: Baker & Co. are still taking out good rock at the Ned Leonard mine, and will soon commence crushing at the Gold Bluff mill.

CUSTOM MILL.—What we want here is a custom quartz mill to test some of the thousand and one ledges that are to be found in this vicinity.

BONANZA.—The tunnel to open the Virginia and Bonanza mining claim, at Howland Flat, is now in about 800 feet, and is being pushed forward. The ground is known to be very rich, having been tested by the Empire, which has been one of the richest mines ever opened in that section.

BREAK-DOWN.—The eccentric shaft which carries the pump rods at the Pliocene mine broke on Saturday last, stopping the works. Superintendent Thurston left immediately for San Francisco. The shaft is of cast-steel and was made in the East.

Nevada.

WASHOE DISTRICT.

CON. VIRGINIA.—Gold Hill News, Jan. 23: Daily yield, 650 tons of ore. The mills are all kept steadily crushing and the yield of bullion for January is already largely in excess of the usual yield at this date in the month. An immense reserve of ore is being piled up at the mills and it would hardly be possible to find another as prosperous an outlook as the mine presents anywhere. The ore stopes and breasts on the 1200, 1300 and 1400-ft levels all show well and are yielding good ore at almost every point. The winzes and drifts opening up the southwest ore body on the 1500-ft level are all advancing as usual. There may be some who do not understand the order of the crosscuts on the several levels of this mine. For their benefit, we will state that on all the levels, crosscut No. 1 is the drift very nearly, if not quite always, on the dividing line between the California and Con. Virginia mines, and that the numbers counting from that increase going southward in the Con. Virginia, and likewise increase going northward in the California.

CALIFORNIA.—Daily yield, 750 tons of ore. The mine is looking splendidly in every part. The mills are all crushing to their fullest capacities and the yield of bullion for the month of January is already \$200,000 in excess of the usual yield at this time of the month. Reserves of ore are steadily accumulating at the mills, and the prospects of dividends for many months to come were never better than now. The ore stopes on the 1600, 1650 and 1700-ft levels are looking well and yielding rich ore.

YELLOW JACKET.—On the 2200-ft level the crossdrifts east and west from the main north drift are each in 80 feet and both are in porphyry and quartz. The main east drift at the same level towards the new shaft is still running in hard blasting rock. The new shaft is now down 1,170 feet.

SUTRO TUNNEL.—Face of header in somewhat softer vein matter, requiring close and careful timbering and lagging to guard against possible caves. Slight increase of water. Total length of tunnel, last evening, 18,762 feet.

OPHIR.—Sinking the main incline is going ahead prosperously, the rock in the bottom blasting out well and making an excellent shaft. The bottom is almost entirely dry. The south drift from the 1900-ft station is being steadily advanced, the face in blasting ground, with a considerable flow of hot water. This drift is very hot. The joint Mexican winze on the north line has reached the 1900-ft level, and a drift is being run at that point to meet and connect with the joint west drift from the north drift on the 1900-ft level. This connection will be completed in a very short time. The east drift on the 1800-ft level is steadily advancing in good blasting ground, toward where it is expected to cut the east ore vein found on the 1900-ft level. The air connection with the Sierra Nevada mine on the north is greatly benefiting the mine on all its levels.

LADY WASHINGTON.—On the 850-ft level the main south drift continues in low grade ore. It is all quartz of the finest character, assaying \$12 and more to the ton. This drift will connect with the drift being driven from the Justice mine to meet it inside of 10 days, when good, advantageous ventilation will be afforded. The Lady Washington company will then make a crosscut to the east through the ledge at the Justice line.

BELCHER.—Sinking the north incline shaft is making excellent progress. It is now down 150 feet below the 2100-ft level. The east drift from the 2100-ft station is steadily advancing

toward the ledge, the face in porphyry. An east drift from the bottom of the 1900-ft winze has been started and is now in 45 feet.

JULIA CON.—The new hoisting machinery for the incline below the 1800-ft level arrived at the mine yesterday, and is being placed in position as fast as the nature of the work will admit of. The foundations are all ready to receive it, so that to set it running will be a comparatively short job. Sinking the incline is making steady and favorable progress. Preparations are now about completed for starting a diamond drill in the face of east crosscut No. 1 on this level.

MEXICAN.—The joint Ophir winze has reached the 1900-ft level, at which point a drift is being driven eastward to connect with the west joint winze from the Ophir north drift. This connection is a very important one and will be completed in a very short time. The ventilation obtained by a connection with the Sierra Nevada mine, on the 1600-ft level, is beginning to exhibit its good results in every portion of the mine, the men being able to do almost double the usual amount of work.

ALTA.—Sinking the main shaft to cut and prospect the ore vein in a downward direction is being pushed ahead with all the energy possible. It is now down 73 feet below the 1150-ft level. The south drift on the 1150-ft level is steadily advancing, the ore in the face showing a steady improvement. This drift is also being advanced with all possible speed to reach a point below where the rich ore was found on the 1050-ft level.

GOULD & CURRY.—Retimbering the main shaft will be completed in a day or two more. Sinking the main incline is going steadily forward. An upraise has been commenced from the west drift on the 1900-ft level to drain the water and connect with the bottom of the incline in its downward course. A large new air-compressor, built after the same pattern as that now in use at the C. & C. shaft, is being put in.

UNION CON.—The winze connecting with the Sierra Nevada south drift, on the 1600-ft level, has been thoroughly timbered, and now furnishes splendid ventilation for the mine to that depth.

NEW YORK.—The material at the bottom of the shaft shows considerable improvement. It is hard quartz and porphyry, with streaks of ore which give good assays.

CON. IMPERIAL.—The north drift from the bottom of the winze on the 2400-ft level is being advanced at a very rapid rate.

SENATOR.—Men are employed fixing up the machinery of the hoisting works preparatory to resuming operations in the mine, and a tunnel is being run in the surface workings to better define the top of the ledge. The Sutor tunnel is less than 100 feet from the eastern line of the Senator, and when it has arrived at the proper point, lateral drifts will be run north and south from the tunnel, by the Senator company, arrangements having been made for that purpose. An upraise will also be made to connect with the old Senator workings.

OVERMAN.—The south drift on the 1400-ft level is making steady and favorable progress. A crosscut east has been started on the 1000-ft level, which is making good progress, the face in very favorable ground.

JUSTICE.—The Pacific mill was started up on ore from the mine day before yesterday. There is a good supply of ore already at the mill, and all the winzes and ore chutes in the mine are full to overflowing. It is the intention to soon start other mills on the ore.

UTAH.—The north drift on the 1300-ft level is steadily advancing, the face in much softer ground. The north drift on the 1150-ft level has reached the north line, and a west crosscut has been started at that point.

NORTH CON. VIRGINIA.—Sinking the shaft is making excellent progress, the rock in the bottom being quite hard.

BEST & BELCHER.—Work has been resumed in the face of the north drift on the 1900-ft level. As soon as the water is drained on this level, sinking the deep winze below the 1700-ft level will be resumed to connect with this drift.

CALEDONIA.—The north drift on the 1600-ft level is steadily advancing, the face in good working ground. The east crosscut on this level is developing some very fine quartz.

BULLION.—Sinking the main incline is going vigorously forward and is making fair progress, considering the extreme hardness of the rock penetrated.

SAVAGE.—The foundations are all in readiness and a portion of the new pump-boh is being lowered into position to-day. It will now be but a very few days before everything will be again in good working order.

SILVER HILL.—The new plunger pump at the 800-ft station is working finely. The east crosscut on the 800-ft level is steadily advancing, the face in very encouraging ground.

HALE & NORCROSS.—The water is now only 20 feet above the 2000-ft station and appears to be very weak, the pumps gaining on it easier than at any time for months past.

BALTIMORE AND AMERICAN FLAT.—The drifts and winzes from the 1050 down to the 1400-ft levels are now nearly all repaired and in good working order again.

CROWN POINT.—Daily yield, 60 tons of ore. Sinking the south winze below the 2000-ft level is making steady progress.

CHOLLAR POTOMI.—Sinking the Combination shaft is making the usual fair rate of headway. The old shaft is being retimbered.

LEVIATHAN.—Pushing the incline down toward the 700-ft level at a lively rate. The new hoisting arrangements work finely.

SUCCOR.—Good streaks of low-grade ore con-

tinue to be cut through in sinking the shaft.

TRONAN.—The ore stopes continue their good yield and promise, and about 50 tons per day of ore is being extracted, keeping the Vivian mill constantly running.

BRISTOL DISTRICT.

MAYFLOWER.—*Pioche Record*, Jan. 19: Most of the past week has been spent in straightening and repairing incline. The north and south drifts have been extended each about 12 feet, both having good ore. The ore struck in the north drift assays over \$200. Owing to stormy weather very little work has been done on the road.

CHICK EASTERN.—Owing to the stormy weather but very little work could be done in putting up whin. Expect to finish it and take out loose rock at bottom of shaft, after which work of drifting and taking out ore will commence.

DAY STATE.—The contractors have continued the incline some 10 feet. The whole incline is in good ore, about a foot and a half assaying \$200.

ELY DISTRICT.

PIOCHE BULLION.—*Pioche Record*, Jan. 14: \$18,293.04 in bullion was shipped during the past week, according to the reports of Superintendents.

SHIPPED.—The five-stamp mill at Bullionville has all been taken down and the last of it was shipped to Silver Reef on Tuesday. It will be rebuilt there.

RAYMOND & ELY.—Have had to suspend work on the winze below 11th level on account of water. The other portions of the mine are running about as usual. The 30-stamp mill was stopped five days last week for necessary repairs, but is now running on tailings.

ALPS COMPANY.—The stopes above the 11th drift, and in winze below 11th, are producing high-grade ore. The drift west from 12th station is being run with eight-hour shifts and is now in a distance of 75 feet. The works were closed down three days since last report on account of the freezing of the main water pipes. The mill is running regularly; company shipped \$8,800 fine bullion during past week.

EUREKA DISTRICT.

MINING ITEMS.—*Eureka Sentinel*, Jan. 19: There are 700 tons of first-class ore on the Hamburg dump at the mine. A small lot of ore from the Mortimer mine, worked at the Richmond furnace, yielded \$962. The population of Ruby hill, including both the Eureka and Richmond sides, will reach 1,500. General Connor has shipped a lot of Silver West ore to the Sacramento smelting works. The Ridge-way mine has been sold at Sheriff's sale, and brought \$70, not enough coin to pay the costs. The Eureka Consolidated furnaces are averaging 48 tons of crude bullion a day. Slag-pot explosions were quite frequent last night. The exciting cause was the prevailing damp weather.

The Eureka and Richmond furnaces consume 9,500 bushels of charcoal daily, the same costing \$2,375. The Prospect Mountain tunnel is in 550 feet, the face of it in hard, blue limestone. The crystallizers at the Richmond refinery will suspend operations to-day, but will start up again Monday morning. The cupels will continue at work as usual. The Sacramento smelting works draw largely on Eureka for material. Flue-dust, litharge and rich ores are daily forwarded by General Connor. The Richmond company have piled up, in front of their refinery, an acre of cord-wood and are adding to its proportion daily. About 40 miners, including chloriders, find constant employment at the English company's mine, Mineral hill. The repairs to the K K furnace have been completed and the works are in good order for another prolonged and profitable run. Furnaces Nos. 3 and 4, at the Eureka Consolidated works, are making a very long run, having been nearly five months in constant operation. It was expected that they would have to be relined a month ago, but they are still turning out their daily quota of bullion and are good for another month's campaign.

BULLION.—About \$115,000 worth of crude bullion was shipped last week.

JACKRABBIT DISTRICT.

DAY MINE.—*Pioche Record*, Jan. 19: The winze from south drift has connected with upper tunnel; five feet of good-looking spar, assaying \$38 per ton, and three feet of rich ore, making vein eight feet wide, with an opening at bottom, with a strong current of air. All the work done shows this to be a regular defined fissure vein. The ore in the open cut continues to develop in length and depth. In the lower tunnel have struck a very promising vein of black spar, assaying \$23 per ton; will drift both ways on the vein next week. Teams are now hauling to railroad at Ham Light station. There is now at the mills at Bullionville 350 tons of ore. The 20-stamp mill will start on this ore as soon as quicksilver arrives, which is expected daily.

TEM PAHUTE DISTRICT.

TO BE DEVELOPED.—*Eureka Sentinel*, Jan. 18: The recent organization of the Tem Pahute company, of Chicago, and the arrival of its representatives at this point, is an assurance that the known valuable locations in that district will be developed at an early date. The officers are wealthy men, and the working capital subscribed is sufficient to demonstrate the worth of their property. Col. J. H. Baker, a well-known resident of eastern Nevada, and the original owner of the series of locations that now belong to the Tem Pahute company, has been appointed Superintendent, and since his return

from his visit East, has, in conjunction with the gentlemen who accompanied him, been busy arranging for the forwarding of supplies, machinery and men. They experienced some difficulty in procuring teams to transport their freight, but cut the Gordian knot yesterday by buying outfits of their own, which were loaded and sent forward last evening. Ten miners were also employed, and the force will be added to as the work progresses. It is the intention of the company to build a mill next summer if developments warrant.

Arizona.

HUMBURG DISTRICT.—RICH STRIKE.—*Arizona Enterprise*, Jan. 16: Messrs. D. R. Poland and J. A. Robinson arrived here, yesterday, from Hamburg mining district. We have had a conversation with Mr. Poland and learned the following: A few days ago, a vein of ore, assaying a trifle less than \$20,000 to the ton, was struck in the south claim of the Tip-top company. In addition to the foregoing, McCaunon & Gillespie have struck a very rich vein of gray carbonate ore in one of their claims, the Jenie Greene. TOM BARNUM has all the rich ore he wants in the Basin ledge.

POLAND, Roberts, Billy Gavin and others have sunk six shafts to a depth of 15 feet each, upon six lodes, and they are now sinking, with might and main, upon the Willow and Treasure Trove lodes, which are yielding very rich silver ore.

BIGELOW & Co. and scores of others are piling up ton upon ton of very rich rock.

The Tip-top company have a force of 100 men employed in opening a road to the pine timber on Bradshaw mountain. Said road will be about eight miles long. It is their intention to erect and run a saw-mill.

People are every day arriving in the district, and the excitement is so great that even the oldest "boys" are more or less saturated with it.

The weather is fine in Humburg; no snow and scarcely any frost. Things are now simmering, but they will boil as soon as the Tip-top company's new 10-stamp mill shall have made a clean-up.

MOHAVE COUNTY MINES.—We feel safe in asserting that the new 20-stamp quartz mill of the McCrackin company is now at work, crushing in the neighborhood of 100 tons of ore every 24 hours. The Signal company's 10-stamp mill is reducing nearly 50 tons of ore every day. The mill at Mineral Park is pounding away. That at Hackberry will soon be running, so that our Mohave county friends may expect lively times; that, too, in a very short time. The county is one of the richest in metals and minerals in the Territory, and, being nearer the bases of supplies than the majority of her sisters, her immediate prospects for development are indeed good.

Colorado.

AMERICAN.—*Sunshine Courier*, Jan. 12: The ore body continues good in the drifts of the crosscut vein of the American, and large quantities of ore are being sent up. The 300-ft drifts are producing good ore, with considerable ruby silver intermixed.

G. B. STANLEY is sinking a 10-foot shaft on a new discovery, just north of town, for Harvey Denniston. The surface quartz pans nicely in free gold, and as it is on the belt it promises to make a good mine.

A. SHAEFFER and P. Bucher are at present working the Revenue lode, in Central gulch. The shaft is 27 feet deep, and by specimen assay the ore has run as high as \$540 per ton.

The Corning Tunnel Co. was nonsuited in its case against the Slide Co., in Denver, last week. We hope this will end the litigation, and that vigorous work may soon be done on this piece of property.

The Grand View mine was fully cleared of water last Saturday. A contract for sinking 30 feet was to be let towards the end of the week, and work will be pushed by three eight-hour shifts, the idea being to get down in the least possible time. The shaft was 230 feet deep when work was stopped for want of the facilities which the new engine now provides.

GOLDEN AGE.—Mr. Walker has been piling up the Golden Age ore until he has several hundred tons ahead. The new mill at Jamestown was started Monday night for the first time, and has been running steadily ever since, giving handsome results. There are now 35 hands employed at the mine, and it is expected the force will be increased to 60 men very soon. The shaft is looking splendid in the bottom, at a depth of 63 feet, where they are now taking out the finest ore the mine has ever produced.

Idaho.

SAN FRANCISCO.—*Idaho World*, Jan. 15: The Superintendent of the San Francisco company is pushing work ahead on the Atlanta ledge, in Alturas county. Over 200 feet of crosscuts have been run without succeeding in finding the pay vein, and work is being prosecuted on a drift west, following the ledge, with good indications that pay ore will soon be found. Mr. R. B. Brown, the Superintendent, is very persevering in his labors for the company, and we believe his energy will be rewarded by finding a good ledge yet.

WAGTOWN.—*Idaho Avalanche*, Jan. 10: The Jones mill at Wagtown has resumed operations after being idle for the past few weeks. A considerable quantity of rock has been forwarded from the Lepley mine for crushing. It is expected to make a handsome yield. Favorable reports have again been received relative to the resumption of work in the Empire. The

prospects now are that a fresh start will be made during the coming fortnight. Work is progressing as usual at the Illinois Central. It is announced that the Potosi will start up in a few days.

The Black Jack ledge still continues to wear an unusually promising look, and the work is being rapidly pushed forward.

Much anxiety is still felt relative to the completion of the ledge in the lower levels of the Golden Chariot. The work has not progressed sufficiently far yet to justify the formation of any decided opinion, but the indications are decidedly favorable.

Montana.

BULLION.—*Helena Independent*, Jan. 10: In a little less than one year, ending December 31st, there was melted and run into bars at the U. S. assay office, in this city, gold bullion of the value of \$390,911, and silver bullion valued at \$229,766—total, \$620,677. It is estimated that the gold and silver bullion produced in Deer Lodge county in the month of December last exceeds \$125,000, of which \$30,000 came from A. J. Davis' mill, at Butte. Verily the production of gold and silver in Montana is but in its infancy.

HOPE AND NORTHWESTERN.—*New Northwest*, Jan. 10: The mills of the Hope and Northwestern companies at Philipsburg are running regularly, and both mines are being worked with full crews of men. For the past five months the prospects of both companies have been continuously flattering.

A FINE body of ore was developed in the 260-ft level of the Speckled Trout mine, and now speculation is general as to what the developments are at the 310-ft level. Good ore having been sent up from the winze all the time, we have good reason to hope for favorable reports.

The Raymond & Ely Mine.

The annual meeting of the Raymond & Ely Mining Co. was held on Tuesday.

The President said that the most important work now in progress was a crosscut on the 1200-foot level into a new body of ore called the "black ledge." There was \$60,000 worth of supplies on hand, and the mine and mills were in good condition. The railroad was paying expenses. The schedule of the property shows an aggregate value of \$781,664.89.

The following is a condensed statement of the receipts and disbursements:

RECEIPTS.	
Cash on hand last annual report.....	\$2,293 50
From bullion.....	295,155 74
Ore sales.....	6,416 60
Sundry sources.....	51,621 23
Total.....	\$355,487 07
DISBURSEMENTS.	
Ore extraction.....	\$38,617 00
Dead work and prospecting.....	49,632 41
Supplies for mine.....	21,201 79
Wages.....	40,254 83
Supplies for mills.....	54,195 40
Ore purchases.....	25,683 40
Bullion discount.....	24,689 73
Cash on hand December 31st, 1877.....	15,940 36
Sundries.....	85,216 15
Total.....	\$455,487 07

The report of the Superintendent shows 2,596 tons of ore extracted, at an average cost of \$19.69 per ton; 2,372 tons were reduced at the mill, the average assay value being \$76.73 per ton, and bullion was produced amounting to \$154,416. Tailings amounting to 16,832 tons were reduced, the average value being \$26.37 per ton, and produced bullion amounting to \$135,932. There are now 19,000 tons of tailings on hand, estimated to be worth \$1,440,000, or \$18 per ton.

Academy of Sciences.

The regular meeting of the California Academy of Sciences was held on Monday evening last, Prof. Davidson in the chair. A paper was read by the President, from information derived from Capt. Thos. W. Williams, on "The Habits of the Walrus." A paper by Dr. G. F. Becker on "Rainfall in California" was also read. Mr. Lockington described "A New Species of Fish." Prof. Gustaf Eisen submitted a paper "On Anatomy of Oenodritus." B. B. Redding read an important and valuable paper on the "Climato of California," which we publish in full.

The following new members were elected: Miss Caroline L. Hunt, Mrs. L. M. F. Wanger, C. C. Cadman, Alex. Del Mar, Francis A. Holman, G. P. Rexford, Miss S. A. Plummer, Mrs. J. H. Sargent, Miss Jessie Smith, E. S. Parker, J. G. Lemmon, John T. Evans, Miss Helen Thompson, Mrs. M. E. Edwards. These ladies are the first ever admitted to membership in the Academy.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Manhattan, Jan. 15th, \$7,296.94; Grand Prize, Jan. 21st, \$30,760; Alps, Jan. 21st, \$2,389; Northern Belle, Jan. 19th, \$4,824.67; Endowment, Jan. 21st, \$1,375.79; Con. Virginia, Jan. 19th, \$139,736; California, Jan. 19th, \$153,206; California, Jan. 22d, \$212,902.22; Con. Virginia, Jan. 22d, \$198,143.75; Alps, Jan. 23d, \$5,460; Martin White, Jan. 22d, \$30,037.

A. L. FISH & Co., of this city have sold to the Town Trustees of the town of Vallejo one of the Clapp & Jones steam fire engines, for which they are agents. The engine is a very handsome one, and is bought subject to test.

News in Brief.

A \$10,000 fire occurred at Virginia City on Tuesday.

EUROPE is anxiously awaiting the peace negotiations.

FURTHER depredations by border thieves in Texas are reported.

NEARLY a hundred murderers were hanged in the United States last year.

The weather at sea off this coast has been very tempestuous of late.

The temperance movement is still progressing successfully in this city.

By the recent Connecticut railroad disaster, 13 persons were killed and 46 wounded.

THE United States has sued the Erie railroad to recover \$67,000, alleged back taxation.

SLADE, the "Medium," after being expelled from Vienna went to Berlin, whence he was also expelled.

THE Western Union company has increased its rates to the various points west of New York about 20%.

A BILL has been introduced into Congress to amend the law governing the appointment of postmasters.

RECENT shipments of American goods to Ceylon have been so successful that orders have been sent for more.

JOHN W. MACKAY and W. S. Keys have been appointed commissioners from Nevada to the Paris exposition.

THE funeral of McCarthy, the Fenian, at Dublin, is said to have been the most imposing display since O'Connell's burial.

JAMES GORDON BENNETT has purchased the steam yacht *Pandora*, and it is said she is again to be used for an Arctic expedition.

An official statement of the Russian Minister of Finances estimates the extraordinary expens occasioned by the war at 432,000,000 roubles.

THE run on several of the savings banks in this city this week was soon over, the depositors feeling assured that the draw was unwarranted.

THE Governing Committee of the New York Stock Exchange have voted to expel Netter and Bonner, who failed after re-hypothecating customers' collaterals.

J. W. BONES, the "Workingmen's candidate," has been elected State Senator from Alameda county, to fill the unexpired term of the late Senator Nathan Porter.

THE Supreme court has affirmed the decision of the lower court, in the case of John Runk, convicted of murder in the first degree, and he will therefore be hanged.

THE Empire pipe line, which carries the oil from wells in the Pennsylvania oil regions to the railroad, has been purchased by the United pipe line for about \$1,100,000.

THE Cherokee nation object to the Senate bill allowing Indians to become citizens of the United States. They think the bill is in conflict with the treaty obligation and acts of Congress.

THE Senate Finance Committee agrees to recommend the passage, with sundry amendments of the bill introduced by Senator Davis, of Illinois, to remit taxes on insolvent savings banks.

THE House Committee on Appropriations has finished the Fortification bill. It does not differ materially from the bill passed last year. It appropriated about the same amount, \$275,000.

OVER 1,000 men applied for work at \$1 per day in digging on the Southern Pacific R. R. ground on the Potrero. The men are paid every night. This is an indication of the "hard times" in this city.

AFTER a short deliberation, the jury in the case of Kearney, Wellock and Knight, on trial for misdemeanor, for the use of incendiary language tending to riot and breach of the peace, brought in a verdict of not guilty.

PROF. GEO. DAVIDSON delivered a lecture last Saturday evening on "Irrigation," being one of the course being given for the benefit of the Oakland Free Reading Rooms. The lecture was instructive, practical and interesting.

GEO. A. CROFUTT, author of "Crofutt's Trans-continental Guide," has lately been on a tour over every railroad in this State. He returned East this week and can be addressed at the Briggs' house, Chicago, for the present.

A CONSIGNMENT of 500,000 white fish eggs from the State hatching house at Northville, Michigan, have arrived in the city for consignment to New Zealand. A shipment has also been received for distribution in this State.

THIEVES and pickpockets are unusually numerous in this city at present. During the first 20 days of this month some 30 citizens have been garrotted, and either beaten or robbed, while on the way to their homes or places of business.

THE funeral of Victor Emmanuel, which took place in Rome on the 16th inst., was very impressive. The official portion of the procession was a mile long, and there were also 2,700 deputations from different parts of the kingdom.

TO SUBSCRIBERS.—We have recently made a contract with the publishers of *Hall's Journal of Health*, New York, to furnish us that old and popular publication, for any of our subscribers at 75 cents a year, postage paid. Any subscriber, old or new of the PRESS, can have the advantage of club rates for *Hall's Journal of Health* by sending us 75 cents. Regular subscription price, \$1.50.

THE ENGINEER.

Losses to Railway Investors in 1877.

We see by the *Railway Age* that during the year just closed the process of winding up and reorganizing railway corporations have gone on in the United States with even greater rapidity than in the previous year, whose record gave such an impressive and startling picture of the losses of railway investors. While the year 1877 has given, as was hoped, many encouraging evidences of the approach of better times, and the net earnings of most of our roads have shown a considerable improvement, still it was inevitable and expected that many more inflated enterprises would collapse under the shrinking process that has so mercilessly brought down values based on the standard of the era of speculation. It was hoped, however, that the number and aggregate amount of the bankruptcies for 1877 would at least not exceed those for 1876, but this hope, it will be seen, has been disappointed.

The *Age* gives a table showing a list of the railways sold under foreclosure during 1877. These cover 54 roads in all, whose total bonds, debt and stock (capital invested) was \$198,984,400. Total miles of roads 3,875. This is a truly appalling record of loss, as it must be remembered, foreclosure sales, as a rule, mean the absolute "wiping out" of the capital stock, and often of all mortgage liens except the first, though the purchasers under the foreclosing mortgage sometimes pay the floating indebtedness, that and their mortgage and the accrued interest representing the cost of the property to the purchasers, and therefore its approximate value after the shrinkage has been completed.

In addition to this is given a list of roads against which foreclosure proceedings have been commenced, generally accompanied by their transfer into the hands of the receivers, during the year. There is a total of 44 roads in this condition, whose total bonds, debt and stock (capital invested) amount to \$320,681,980. There are 5,409 miles of these roads.

There are also a number of roads ordered sold in 1877 but not yet placed on the auction stand. There are a total of 16 of these roads, comprising 2,388 miles, with total bonds, stock and debt (capital invested) of \$255,921,900.

Summarizing now from the above we have the following approximately correct comparative statement of the result of the wiping-out process during the last two years:

COMPARATIVE STATEMENT FOR TWO YEARS.			
	No. of Roads.	Mileage.	Capital Invested.
1876—			
Sold under foreclosure.....	30	3,846	\$218,000,000
Proceedings commenced.....	46	7,576	\$38,000,000
1877—			
Sold under foreclosure.....	54	3,875	\$198,984,400
Proceedings commenced.....	60	7,797	\$56,437,230

Eighty-four roads, with a complete mileage of 7,721 miles, or one-tenth of the entire railway system of the United States, and representing an apparent investment of \$400,000,000, also about one-tenth of the entire railway capital of the country, have in two years been sold under foreclosure, and have been "scaled down" to perhaps something like 50% of their original valuation. The figures for proceedings commenced, etc., are only given for the purpose of comparing the two years, as a number of the roads reported for 1876 under this head have during 1877 moved on to sale. But during the past year proceedings have been commenced against 44 roads with a mileage of over 5,500 miles, and it is safe to estimate that as a result of the two years' work at least 100 roads are soon to be sold, with an aggregate mileage of 12,000 miles and representing something like \$500,000,000! This fearful array does not by any means include all the roads already doomed to foreclosure, but still when these have passed through the ordeal and like their predecessors started anew on the basis of real values the awful era of foreclosures, it is safe to say, will be practically over, and capital, even though invested in railways, will again receive some return.

Irrigation in India.

On the 13th of December, at a meeting of the English East India Association, Gen. Sir A. Cotton read a paper on "The Prevention and Counteraction of Indian Famines." Sir A. Cotton insisted, says *Iron*, that there was no guess work or uncertainty about data on which he advocated irrigation and navigation works in preference to railways. Their necessarily higher rates greatly restricted traffic, and in case of disturbance they could not be so easily protected as water communication could be by armed steamers. There existed thousands of old tanks dependent on local rains, and these ought to be at once supplied by channels cut from the rivers. He differed from those who complained of the hopeless state of India, and believed that its advance was indicated by the increase of trade even without cheap transit, the increase of railway traffic at ruinous charges and the increase in the consumption of salt, of which the poor people did not eat half what they required. He contended that this concurrence of testimony justified the demand for a commission of known and approved men, independent of the India Office, to investigate the subject. Mr. John Jones dwelt upon the fertility of and the absence of famine in the district watered by the Madras Irrigation Company. Mr. Small, from Rajpootana, testified

that well-supplied tanks had promoted a material prosperity which secured the loyalty of a large population at the time of the mutiny. Mr. Bowden, an agriculturist from the Godavery district, testified to the traffic on its canals and the absence of famine in their neighborhood. Mr. Wood, who had been connected with a railway in Bengal, showed that canals were feeders of railways.

The Madras Irrigation and Canal Company, during the season from July, 1876, to April, 1877, had irrigated about 95,000 acres, being an increase of previous seasons of about 28%. The engineers of the company state that there is a growing feeling in the minds of the natives in favor of irrigation.

THE FUTURE OF THE ENGINEERS.—At a meeting of the Liverpool Engineering Society, December 19th, Mr. Graham Smith, gave an address on the "Status and Prospects of Engineers." The speaker said that the remains of canals, aqueducts, reservoirs and other works are to be found in Egypt, India, China, and, in fact, all over the world, clearly denoting that the ancients possessed men answering the description and filling the position which the engineer of the present day occupies. He said the works of the ancients were held in estimation by their kings and rulers, for among the titles of the god, Vul, were those of "Lord of Canals," and "The Establisher of Irrigation Works." At the present time the profession was little recognized, and titles were sparsely distributed to the leaders of the profession, but an engineer ought to care little about them, as by his own work he may gain more distinction and honor than it was in the power of all the crowned heads of Europe to bestow. To succeed as an engineer, a man must have ability and training to do his work, and he must love it, or the disappointments and hardships encountered during the earlier part of his professional career will possibly cause him to underestimate his capacities, and render him wanting in self-reliance and decision of character. Nevertheless, trials are almost necessary to the proper development of an engineer, just as iron must pass through the fire before it is converted into steel. The difficulties facing a young man about to enter upon a private practice he thought greater than those experienced in other professions, and remarked in conclusion that magnificent works yet remained to be carried out which would immortalize the names of the engineers.

HUDSON RIVER TUNNEL.—Work has been suspended until spring on the tunnel under the Hudson river, New York. Two shafts will be sunk, one in Jersey City, the other in New York, near Morton street. Then the excavation of the tunnel can be begun underneath the river, two bodies of men being at work. The ground on which the Hoboken (Jersey City) shaft is being sunk is made ground, and great precaution is necessary to guard against the possible caving in of the sides. A circular brick shell was first built. As fast as the earth was excavated from under it the wall sunk, while a gang of workmen kept piling more brick at the top, and in this manner the shaft has reached its present depth of 30 feet. It is to be 70 feet deep when finished. The tunnel will be 26 feet feet wide, 24 feet high, and, if the enterprise is profitable, it will be carried under New York and the East river, it is stated, to Brooklyn.

THE SUEZ CANAL.—Mr. Consul Perceval, in his annual report to the foreign office on the trade of Port Said, shows that the depression in trade has affected the traffic through the Suez canal, but he adds: "Notwithstanding the decrease in the total number of ships, 1,092 vessels under the British flag, amounting to nearly 75% of the whole traffic, with a tonnage of 1,578,238 tons net, passed through the canal during the year, being an increase both in British ships and tonnage of 31 in the former, and 100,492 in the latter. The canal has been kept in good working order, and the requisite depth of water maintained, with the usual amount of dredging, and the company have faced the hanks in various places with stone to prevent the sand falling in."

NORWEGIAN RAILWAYS.—The Norwegian railway system is being rapidly extended. There are now 364 miles of line in operation; these lines have been constructed at a capital outlay, including rolling stock, of £2,705,500. Further lines are in progress to the aggregate extent of 670 miles; the estimated cost of these lines is £4,230,780. Some of the Norwegian lines are on a 4ft. 8½ in. gauge, and others on a 3ft. 6 in. gauge. The 4ft. 8½ in. lines cost £7,930. per mile. The 3ft. 6 in. lines cost £5,070. per mile.

PROGRESS ON THE BROOKLYN BRIDGE.—The *Iron Age*, learns from Engineer Paine, of the East River Bridge company, that the close of the old year was signalized by finishing eight strands of the 19 which will form each of the four great cables. The cable work, therefore, is eight-nineteenths done, and the whole will be finished next summer. Work is going forward satisfactorily, with no delay from any cause other than that occasioned by short days.

IRON BRIDGE IN JAPAN.—A massive iron railway bridge over the Roktigo river, constructed for the use of the Tokio and Yokohama line, at an estimated cost of \$320,000, was opened for traffic on November 27th.

Old Bridges in China.

The most remarkable evidence of the mechanical skill and science of the Chinese at an early period, is to be found in their suspension bridges, the invention of which is assigned to the Han dynasty. According to the concurrent testimony of all their historical and geographical writers, Sangleang, the commander of the army under Kaou-tsoo, the first of the Hams, undertook and completed the formation of roads through the mountainous province of the Shersa to the west of the capital. Hitherto, its lofty hills and deep valleys had rendered communication difficult and circuitous. With a body of 100,000 laborers he cut passages over the mountains, throwing the removed soil into the valleys, and where this was not sufficient to raise the road to the required height he constructed bridges, which rested on pillars or abutments. In another place he conceived and accomplished the daring project of suspending a bridge from one mountain to another over a deep chasm. The bridges, which are called by the Chinese writers, very appropriately, flying bridges, and are represented to be numerous at the present day, are sometimes so high that they cannot be traversed without alarm. One still exists in Shensa, stretching 400 feet from mountain to mountain over a chasm of over 500 feet. Most of these flying bridges are so wide that four horsemen can ride on them abreast, and balustrades are placed on each side to protect travelers. It is by no means improbable (as Mr. Pauthier suggested) that as the missionaries to China made known the fact over a century and a half ago that the Chinese had suspension bridges and that many of them were made of iron, the hint may have been taken from thence for similar construction by European engineers.

A LONG ESTATE.—It is stated (with how much truth we do not know), says the *American Manufacturer*, that the oil producers have secured the actual ownership of a strip of ground extending from the oil region to the seaboard and of a width of one rod, through which to lay their proposed pipe-line. If one or more pipe-lines are laid to the seaboard, it will of course have the effect to diminish the number of inland refineries and build up refineries at the eastern terminus of the line, or lines.

The Emma Mine.

The renewal of shipments of ore from the celebrated Emma mine will naturally cause all who are or have been shareholders in the now almost defunct English company formed for working it to consider anew the value of the property they so thoughtlessly threw away. Throughout all the clamor as to the alleged deception practiced in the transfer of the mine to the English shareholders, as well as since, it has invariably been asserted in the *Mining Journal* that if any reliance was to be placed in the opinion of practical miners who had visited the property, but were peculiarly disinterested in the result of the working, the Emma was unquestionably a good mine, and worthy of development. That the English paid a large price for the mine is admitted, but that price was known to the whole world before the public invested one penny, so that the capitalists who speculated were like children who spend their money in coveted toys, then cry because the money is gone, and smash the toys to vent their spite. As the London Emma shareholders have now neither the capital invested nor the property, they can dispassionately consider their position, and estimate the advantages of patience and common sense in the conduct of mining operations, as compared with rashness and the love of litigation. From the time the Emma mine passed into the hands of the English company exploration (the one thing necessary to secure permanent profits in mining) was entirely neglected, and a system of careless management was carried on, which in a few months would bring into the winding-up courts even such properties as the Cape Copper, Liuares, Fortuna, Fontgibaud, and others equally successful. The London Emma shareholders appeared to suppose that even ordinary business energy and judgment were unnecessary, and that nothing had to be done but to receive the periodical dividends forever. Such marvelous benefits are not secured in mining any more than in any other business.

And the puerile simplicity of the shareholders is the more apparent when it is considered that the fact that the property was being ruined by bad management in the shape of neglect to provide for the future was well known to the shareholders long before it was too late to retrieve their position, and when even a small outlay upon explanatory work would have made the Emma property rank at least with the Richmond, or any other American concern on the English market, as a permanently profitable undertaking. Foremost in his reiterated assertions that the Emma was being crippled through inattention to development, was an esteemed correspondent of the *Mining Journal*—Mr. Henry Sewell—and the few of his facts republished last week suffice to show how small a drag upon the returns from the mine would have sufficed to do all that was necessary. Well may Mr. Sewell wish the readers of the *Journal* to be reminded how often he requested Mr. A. MacDougall to accept the £50,000 offered to the English shareholders by Messrs T. W. Park and Albert Grant to work the mine. It should be remembered that this sum was to be returned

only in case the mine paid for it—that is three-fourths of the net proceeds were to be for the English shareholders, the remaining one-fourth to be devoted to the payment of the £50,000. Mr. Sewell thinks there is no doubt that the English shareholders have been badly directed in their law-suiting business, and he mentions that he predicted to Mr. MacDougall that he would never gain this suit in America, which was a greater reason that the £50,000 should have been accepted.

The character of the rock in which the Emma mine is situated rendered exploration of even more than usual importance; and hence Mr. Sewell remarked in his pamphlet on the Emma (published when there was still time to have avoided the subsequent litigation, which very properly deprived the company of the mine altogether) that, owing to the geological features of the district, and especially the nature of the rock between which the ore body was found—stratified limestone—the future prospects, assuming ore to continue, would entirely depend upon the due working of the mine, so as to have proper reserves, and the due arrangements for development, such as provision for ventilation, and proper machine power for pumping and for raising the ore, and thus pushing on of exploratory works, so as to find further bodies of ore both horizontally and towards depth, as the then existing ore body in the deepest part of the mine showed signs of compression, and so might be expected soon to be reduced, and go off to a mere thread. Mr. Sewell was well aware that limestone formations, such as are found at the Emma mine, and in which he had some years' experience in Spain, Chile, Peru, and Mexico, and in which some of the richest ore bodies have been found, were often affected by such compressions, but so long as there was a continuance of the vein, however thin, there was a fair prospect of its again opening out, and producing as valuable a body of ore as was then being worked. He mentions that even in the celebrated Potosi mines, which for 246 years yielded the Spanish government £800,000 per annum as royalty, the veins were constantly being affected by these compressions, varying from several yards to the thickness of a pen-knife blade.

It is but justice to Mr. Sewell to state that his views appear to be now receiving full confirmation although at the time he wrote they were ignored from the circumstance, probably, of his opinion being diametrically opposite to those of Mr. Warren Hunsley, one of the original vendors and a large local shareholder; of Mr. Silas Williams, the mine agent; of Mr. George Attwood, the mine manager; of Mr. Clarence King, a celebrated American geologist; Prof. Murray, a mineralogist; and Mr. John Longmaid, who condemned a neighboring mine as containing no ore worth raising, though the succeeding proprietor quickly raised 2,000 tons of silver-lead ore, and continued to turn out regularly 300 tons per month with good profit. That Mr. Sewell wrote from actual knowledge, and not from mere hypothesis, seems evident, since in July, 1872, he made an affidavit in one of the local courts that the Emma mine was a bed vein and that it would be proved to be the same as the Flagstaff, Vallego, and several other mines in the district. The correctness of this has now been proved by subsequent events, for the Emma mine is continuous for about 10,000 feet, and is not an isolated body of ore as was supposed by some. Upon these facts Mr. Sewell very reasonably argued that the length of the Emma vein having been proved by actual work of the mines that are situated on the same vein for a distance of 10,000 feet, such as the Flagstaff, Vallego and other, to be a master vein, it is but reasonable to suppose that new ore bodies will be found in depth as well as in length, as already stated. Mr. Sewell explained that the Emma, at the time he examined it, exhibited distinct and marked characteristics of a well-defined segregated strata vein; the footwall has a regular pitch into the hill of about 45°, and a course in a north-westerly direction, corresponding with the footwall in the Flagstaff mine, which development will, in his opinion, prove to be identical with that of the Emma. The accuracy of Mr. Sewell's views will certainly add to his already high reputation as a mining engineer, and, although the Emma mine has been lost to the English capitalists a compensation may be found in the neighboring mines which are still in English hands.—*London Mining Journal*.

RED BLUFF.—The population of Tehama county is a little upwards of 7,000. Nearly one-half the number are residents of Red Bluff, the county seat, and one of the best business points found anywhere on the upper Sacramento. It is eligibly located, on the line of the Oregon and California railroad, and neatly laid out on an elevated bench on the west bank of the river, but by no means on an abrupt bluff of very considerable height, as one might be led to imagine from the name. Both its situation and surroundings, may well be looked upon as more than usually attractive and beautiful. Its court house and other public buildings, inclusive of a very large brick school house, are of the most substantial character, to say nothing of a large public hall, and similar buildings erected by the Masons and Odd Fellows, two fine churches and the many neat private residences that adorn the town and its suburbs. The Sacramento is spanned at this point by a well-constructed bridge, which puts the town in easy communication with Antelope valley, one of the richest and most beautiful in the county. It is all settled up by well-to-do farmers.

The Small Districts in Utah.

Several years ago, says the Salt Lake Tribune, there was quite a breeze of excitement raised here over the discovery of mineral in City Creek canyon. Many discoveries were located and a new district organized, extensive prospect work was done on several of the claims, but no rich strike was made, though extensive bodies of ore carrying a large per cent. of iron and a limited number of ounces of silver were found. It did not pay, however, to ship except for flux, and the discovery of plenty of good material of this character near Ogden and in Tintic about the same time, shut the City Creek mines out of the market. The claims, however, were never abandoned, and last summer about 30 men were at work in the camp taking out iron ore for fluxing and shipping it to the smelters of Salt Lake county.

Last March the discovery of silver-bearing rock in

Red Butte Canyon

Was made, and caused some excitement, but there was something of a "job" about the affair, which caused all hands to drop it with disgust. Ore very strongly resembling that found in Leeds, is to be found there, and honest assays made of it showed it to carry from 12 to 20 ounces of silver and considerable copper. There is another district on the same mineral belt as the City Creek mines, situated in

Hard Scrabble Canyon,

In Morgan county, where a number of claims have been worked to considerable extent, with about the same results as have been obtained in City Creek, the ore taken out being chiefly iron, together with some pyrites and sulphur.

Since the Carrio Steele mine changed hands, little or nothing has been heard from

Camp Floyd District,

Through a number of miners still are picking away in their claims there, and are shipping a few tons of rich ore from time to time. It is true this camp has gone down badly, but it is not the fault of the mines, as there are some very fair prospects in the district which need only a little outlay of capital and labor to make them paying properties. But the camp has been in bad repute because some New Orleans men made a bad investment there and then accused the whole Territory of being a fraud.

In Dugway District

There are some fine pieces of mining property which need development only to bring them to the front. The district is situated near the line between Utah and Nevada, and is not a great distance from White Pine. In the summer of 1876 a Chicago company went in there, built a smelter, got possession of the best prospects without paying for them and then drew out. The whole property was thrown into litigation soon after and has since been lying idle.

Clifton District

Is south of Dugway, approaching nearer in its location to Osceola, Nevada, where the dry placer gold diggings are panning out so well. Several miners have spent the summer in Clifton and have located a number of claims bearing rich rock. Everything in.

Columbia,

West of Great Salt Lake, has been quiet during the past summer. There are several very fine claims in the district, but cheap transportation, more capital, enterprise and energy are wanted to make them pay. In this connection it will be well to call the attention of the country to the fact that our numerous

Coal and Iron Fields

In Southern Utah remain undeveloped. Near that Valley of Death where the saintly Mormons butchered a train of emigrants 20 years ago, there is a mountain of iron lifting its head thousands of feet above the sea and spreading its base over miles, and many miles of country. Its quality is very fine, being equal, as experiments show, to some of the best kinds of iron produced in America. What is true of our iron mountains is also true of our coals. The beds already discovered in southern Utah in close proximity to the iron, are simply immense; so that in the not distant future this Territory is destined to rank as the leading iron and coal State on the Pacific coast.

Table Mountain Mining District.

The miners in Table Mountain district have instituted a move towards giving a new impetus to the mining interest in that district, and thereby developing the rich mines that are to be reasonably supposed exist in the mountain. We notice their having revised the district mining laws in several important particulars, with a view of removing what heretofore has been the main source of the depressed state of mining in the district for the past 12 years, many claimants having taken the full benefit of the law which has been in force, that by payment of \$1 it made the titles to claims valid for one year without the performance of any labor whatever. The effect has been to drive capital and labor from the district. It is the generally expressed opinion that the action of the miners, which met at the Raw-Hide school house, is wise and the course pursued is just and proper, and will inevitably tend to the rapid development of the extensive deposits of gravel known to exist in the mountain and the working of the same on a more extended scale than the old system of working. The wealth stored up in the mountain, which only awaits the energy and

perseverance of the sturdy miner, with pick and shovel to unearth it, is immense. It may be considered as the commencement of a new era in mining in that district. The opening out of claims in the mountain requires, as a matter of course, a great amount of labor; and labor, we say, is cash, yet naught but labor accomplishes the end. Cash capital necessary to open out the claims located or that may be hereafter located on Table mountain gravel range, in every instance, we believe, can be commanded by any company of miners that show a determination of pushing forward and overriding every obstacle that may present itself, with the view of searching the channel at all hazards. This channel or ancient river bed lies hundreds of feet beneath the volcanic matter of which the mountain is formed. There is a vast extent of these Table mountain gravel deposits in this county, unapproached by the prospector's pick. There is no reason to doubt the existence of as rich deposits in the unexplored portions of the channel as has ever been discovered. It is interesting to know the miners, instead of abandoning hope, are preparing in the right manner to revive the mining interests which has languished for years.—*Tuolumne Independent.*

USEFUL INFORMATION.

Cheap Fuel.

The recent rise in coal has caused considerable excitement among steam users, and the old question comes up again, "What can we use to reduce the cost of fuel?" The *American Manufacturer* says: Coal screenings are becoming more in use, and with a small mixture of bituminous coal can now be burnt without using a blast under boilers set with the Jarvis furnace. For years attempts have been made to utilize immense fields of peat in the New England and Middle States. To do this it was necessary to carefully cut it in squares and dry it. Machinery was invented to do this, but the cost of cutting and drying was so large, especially the long time required in drying, that at the present time the matter has been generally abandoned. Recent experiments have been made with fresh dug peat wet from the meadow, without even cutting in squares or drying, and it has been found that with a small mixture of coal screenings or soft coal this can be used under boilers set with the Jarvis patent furnace without using a blast. It makes an immense heat with very little smoke. Before burning dry peat it was found that the gases would fill up the flues, but in the Jarvis furnaces these are fully utilized by the hot air supplied on the top of the fires and the flame varies from white to a clear green color.

SWISS PATENTS.—The *Public Ledger* says in an article upon the subject of patents in Switzerland, that public sentiment in Switzerland is beginning to look with favor upon patent laws, and a loss of a good deal of their watch-making trade, mainly because a Swiss inventor could not be protected, has caused considerable feeling on the subject. Federal Councillor Droz has prepared a bill for a patent law, which has been published in the Swiss journals, and is thus presented to the people. Patents of importation will be granted to inventors living abroad only on the principle of reciprocity. The maximum duration of a patent is to be 15 years. An application fee of 30 francs will be charged, and an annual fee of 30 francs each for the second and third years. Every subsequent year a surcharge will be levied at the rate of 20 francs more than the amount paid in the preceding year. If the inventor refuses to permit the use of his invention by voluntary agreement, the question may be submitted to the Federal Tribunal. The Federal Patent Office may, under certain conditions and circumstances, declare a patent void or withdraw it. The Patent Office is to be composed of three permanent members, elected by the Federal council for six years, and several examiners. The Patent Office must transmit the appeal of an applicant who gives serious reasons for impugning the decision by which his invention was refused a patent to a court composed of at least three examiners, among whom must be none who made the first examinations. The applicant may appeal from this court to the Federal Tribunal, which, hearing fresh experts chosen from Switzerland and abroad, gives the final judgment. No additional fee is charged for an appeal against a first decision. The judgment of the Federal Tribunal is always accompanied with the costs of the appeal.

DOSE FOR RODENTS.—The following cheap and simple method is said to be used in Germany: A mixture of two parts of well-bruised common squills and three parts of finely-chopped bacon is made into a stiff mass, with as much meal as may be required, and then baked into small cakes which are put down for the rats to eat. Several correspondents of the *German Agricultural Gazette* write to announce the complete extermination of rats and mice from their cow-stalls and piggeries since the adoption of this simple plan.

VIOLET INK FOR RUBBER STAMPS.—Mix and dissolve the following: Aniline violet, two to four drachms; alcohol 15 ozs.; glycerine, 15 ozs. The solution is to be poured on a cushion and rubbed in with a brush.

SETTING A BOILER.—In setting a boiler, the location should be as near the engine as possible and free from exposure to currents of air, and should afford convenient access to the flues and fill-pipe connections and general convenience to the fireman. If possible, an out-building should be selected. As it is important to keep the boilers level and to maintain a uniform water line, good foundations must be secured. The side walls must be 12 to 16 inches thick; the furnace and front wall lined with fire-brick; the top should be covered with brick and the steam dome and pipes with felt or other material, to prevent radiation. If the boilers are not suspended, the front end should rest on the fire front and the back end on a stand of cast iron. If a mud drum is used, it should have a rest of good masonry, but the weight of the boiler must not be sustained by it. The stand-pipe should not be used for supporting and supplying the boilers. It makes a joint in an inaccessible place and is liable to leak and rust the sheet to which it is attached. If a mud drum is not used, supply into the back end of the boiler with wrought-iron pipe, using the same pipe for supply and blow-off. A new furnace wall is liable to crack. This should be repaired at once. And at all times the furnace walls and coverings should be kept in perfect order.

A SUBSTITUTE FOR TIN.—It is stated that columbium has been found in large quantities, in Marion, U. S., and in the Amazon stone of Colorado. In color it stands midway between nickel and tin. It can be applied to the surface of other metals like the two just named, and the *Manufacturer and Builder* prophesies that we shall soon hear of columbium-plating. It is slightly lighter than tin, and in its chemical properties, while somewhat similar to the latter, are more nearly allied to those of bismuth and antimony. At present there is little immediate prospect of its becoming an article of commerce. But we must remember that aluminium was not many years ago as little known and rarely seen as columbium, *alias* niobium.

LOST FREIGHT.—The item of lost freight in railroad affairs amounts to a good deal in the course of a year. The Pittsburg, Fort Wayne and Chicago road employs four clerks to look after lost freight. Much of it is found and restored to owners, but the losses in one year to the road amount to about \$20,000. This includes goods of all kinds, principally boots, shoes, and the finer grades of dry goods.

IRON GRINDERS.—Instead of millstones, chilled iron rolls are beginning to be used in England for the purpose of reducing wheat and other kinds of grain.

GOOD HEALTH.

Why Gum and Pine Trees are Good Neighbors.

EDITORS PRESS:—There have been many contradictory rumors abroad in this State respecting the desirability of gum trees around dwellings. We lately were solemnly assured that they were poisonous. No doubt this rumor has reached many readers. As I once heard Spurgeon say: "A lie runs round the world while truth is putting his boots on."

Truth's last new boots then, must be as to gum trees, that they exhale those powerful purifying, antiseptic compounds, peroxide of hydrogen and camphoric acid. A Mr. Kingzett, in England, has been paying much attention to the subject, and has succeeded in producing a new disinfectant, called "Sanitas," containing these compounds. His method consists in decomposing water and turpentine, placed in juxtaposition, by a blast of hot air. "Sanitas" is not only useful as a disinfectant, but also as a preservative in curing meat; preventing and even overcoming decomposition.

The lesson is, keep your houses salubrious and your meat untainted by encircling your dwellings with blue gums.

EDWARD BERWICK.

Monterey Cal.

[The points made by our correspondent are fortified by experience in Africa. It is hardly more than 15 years since the first eucalyptus trees were introduced into Algeria, yet their growth has been extraordinarily rapid. Some remarkable examples are given of the action of the eucalyptus in improving the sanitary condition of unhealthy districts. Formerly it was impossible for the workmen at the great iron mines of Mokta-el-Hadid to remain there during the summer; those who attempted to do so died, and the company was obliged to take the laborers to the mines from a distance by train every morning, and to carry them back every night. From 1868 to 1870 the company planted more than 100,000 eucalyptus, and now the workmen are able to live all the year through on the scenes of their labor. The entire works and the railway leading to them are bordered with thick belts of these trees, and each of the miners has his cottage and kitchen garden surrounded with them.—*Eds. Press.*]

MATHEMATICS AND MEDICINE.—Mark Twain, in *Atlantic* for November, says: Among other talks to-day, it came out that whale ships carry no doctors. The Captain adds the doctorship to his own duties. He not only gives medicines, but sets broken limbs after notions of his own, or saws them off and sears the stump

when amputation seems best. The Captain is provided with a medicine chest, with the medicines numbered instead of named. A book of directions goes with this. It describes diseases and symptoms, and says: "Give a teaspoonful of No. 9 once an hour," or, "Give 10 grains of No. 12 every half hour," etc. One of our sea captains came across a skipper in the North Pacific, who was in a state of great surprise and perplexity. Said he: "There's something rotten about this medicine-chest business. One of my men was sick—nothing much the matter. I looked in the book; it said give him a teaspoonful of No. 15. I went to the medicine chest and I saw I was out of No. 15. I judged I'd got to get up a combination somehow, that would fill the bill, so I have into the fellow half a teaspoonful of No. 8 and half a teaspoonful of No. 7, and I'll be hanged if it didn't kill him in 15 minutes! There's something about this medicine chest system that's too many for me!"

Cause of Decayed Teeth.

A writer in the *British Medical Journal* gives some valuable suggestions on the preservations of the teeth: The general prevalence of dental caries is chiefly owing to food remaining on and between the teeth after meals—from breakfast time till the following morning—when, according to custom, the teeth are brushed; brushed, but probably not cleaned, as the brush is more often used to polish the surface merely than to assist in removing what has accumulated between them. Experiments have been referred to that prove the solvent action of weak acids on the teeth; and I think it will be conceded without proof that, were portions of our ordinary food, mixed and moistened as in mastication, kept during the night at the high temperature of the mouth, the compound would be sour. It follows that dental caries must continue to prevail as now, while it is the custom to allow the food to remain in contact with the teeth all night.

The following observations show the dependence of caries on food remaining in contact with the teeth. When the teeth are wide apart food is not retained, and they generally remain free from caries. The lower front teeth are seldom attacked by caries when, as is generally the case, the spaces between are closed to the entrance of food by tartar. The backs of all the teeth, upper and lower, being kept free from food by the tongue, are seldom affected by caries. Lodgment of food takes place between the bicuspid, between the molars, in the depressions on the masticating surface of these teeth, and on the buccal walls of these molars, and these are the chief seats of caries. While mastication is performed by the molars and bicuspids, the upper front teeth remain free from food and from caries; but, when they themselves are made to do the work of lost or diseased molars, and the food gets between them, caries is certain to follow before long. Further proof cannot be required that, if no food remained in contact with the teeth after eating, they would be free from caries, unless acted on by acidity from other sources. The only indications, therefore, for the prevention of dental caries are the neutralization of acid applied to the teeth and the removal of food before it has become acid. The food should be removed after every meal, and all who have not the opportunity of doing so should not fail to remove it every night at bedtime by rinsing, as the brush cannot be trusted to remove the food from between the teeth.

Wholesome Water.

At a recent meeting of the New York Academy of Science Prof. A. R. Leeds read a paper on the relation between fish and plant life and the probability of drinking water. The subject of the wholesomeness of drinking waters was brought prominently before the public of this section by the excessive mortality of the fish in the Passaic river during last June. This appeared of such importance to the Professor that he made two visits to Paterson to collect information. No naturalist appears to have examined into the nature of the disease. Its external indication was the formation of a soft spot on the side of the fish, and death speedily followed the rapid growth of this spot. That the refuse of factories was not the cause was plain from the fact that the fish had died in great numbers above the falls even in the tributaries of the Passaic, and also in isolated bodies of water like Rockland lake. Mr. John Roe, one of the fish wardens, stated that the water was unusually low during the epidemic and the weather had been excessively hot. Where the disease was most prevalent, the depth of water varied from three to eight feet. It appeared also that at this time unusual amount of aquatic plants of a low order had invaded the stream. The following inferences may be drawn: 1. That the rapid development of vegetable growth may be attended with the production of spores or gemmules forming a specific poison to fish life. 2. That the organic impurities arising from the action of the sun upon shallow water and the gases evolved may originate disease. 3. The supply of oxygen might fall below the point requisite to the support of life by being consumed in the oxidation of vegetable matter; by the partial exclusion of the air from the water by the crust of floating algae; and by a diminution in the supply of highly aerated water from levels by reasons of the drouth. A very heavy rain put an end to the epidemic. The third hypothesis seems the strongest.

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W. B. EWER,.....SENIOR EDITOR.

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SAN FRANCISCO:
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The Week.

The past week has been such as we have been hoping for. The welcome rain has been falling pretty continuously all over the State, and already some of the farmers in the northern coast counties are beginning to cry "hold, enough!" To the miners, however, the bounteous rains are welcome and the more the better. The nozzles are hard at work in every direction throwing the streams of water into the gravel banks; the quartz mills which are run by water power and have been "hung up" so long are pounding away at the accumulated ore on the dumps and the miners are happy. A good mining season is already assured and we are pretty certain to reach the twenty millions' product of bullion this year. The mining news from all directions is cheering, and consequently altogether different from what it has been for the past few months. As we write, Thursday, the rain is pouring down heavily.

We give considerable space this week to an article by Mr. Redding on the "Climate of California," which is worth of careful consideration. The length of the article prevents our giving the usual illustration on the ninth page of the paper, but the occasion warrants the omission.

The suspension of Robert Mitchell & Co., brass founders and plumbers, of Montreal, is principally due to the competition of American goods. Their creditors have given them permission to carry on business under an inspector. Their liabilities are \$100,000.

The Climate of California.

The following interesting paper was read at the last meeting of the California Academy of Sciences by Mr. B. B. Redding. The subject is so important and is treated with such skill and thoroughness, that we give the paper in full. Mr. Redding has had exceptional facilities for collecting statistics on the subject, and has been gathering data for this article for the past six months. The highly valuable information it contains is given in a condensed form, and the paper affords a better explanation of the laws governing the climate of California than has heretofore appeared in print. The article is worthy of careful perusal and preservation:

The temperature of the air, course of the wind, rain and snowfall, are taken daily at 7 A. M., 2 P. M., and 9 P. M., at 83 stations of the Central Pacific and Southern Pacific railroads and their branches, extending from San Francisco to Ogden, Lathrop to Fort Yuma, San Francisco to Soledad, Sacramento to Redding, Sacramento to Willows, and Vallejo to Calistoga and Petaluma. The temperature of the water is also taken at several points, including five stations on the Sacramento and San Joaquin rivers.

In addition to the observations made by the United States Signal Service, the Coast Survey and those made at all the military posts, we thus have three daily observations recorded at 83 stations on the Pacific Coast, extending through eight degrees of latitude and 12 degrees of longitude. These have been kept for the use of the companies, and for the benefit of the people residing in the vicinity of the various stations. As each new station is reached in the construction of a railroad, the agent is supplied with proper instruments, and the record required to be kept. On all the roads first constructed the record has been kept for more than 10 years. On the new road over the Colorado desert from the San Bernardino mountains to Fort Yuma, of course the record is only for the past year. The record of these three daily observations, for even 50 stations for 10 years, makes an army of figures that it is almost appalling to attack; yet, when reduced, and the mean obtained, the results are of great importance, not only to the farmer, but to every citizen. As an illustration of the

Financial Importance of these Records,
That came within my personal observation: In 1869 some gentlemen made an investment of nearly \$50,000 near Summit Station, in the construction of sheds over some lakes under which to cut ice for the San Francisco market. They found it impossible to erect any wooden structure sufficiently wide for their purpose that would bear the weight of snow that annually falls at that point. Their structures are in ruin, and every dollar put into the enterprise (other than it gave a small army of men employment in the erection of their buildings) is lost. Could the gentlemen have consulted these records they would have seen that the annual average rainfall at this point is more than five feet. Nearly all of this falls in the form of snow, and is equal—if the snow that falls did not become compact or melt—to a bank of snow on their lakes and the roofs of their buildings, each winter, of 60 feet in depth. If the farmers who have made settlements on the west side of the San Joaquin river, and have tried unsuccessfully for years to raise crops upon them without artificial irrigation, could have seen the results in the hard, unyielding facts these figures disclose, they would know that they hope in vain for rain, and also hope in defiance of the laws that control climate. They live in a section of the State that is an exemplification of the truth of the law, well stated by Guyot: "That when a mountain chain opposes a horizontal wind the air is forced up along the slopes; its vapors are condensed, and water the side exposed to the wind, while on the opposite slope the same wind descends into the valley dry and cloudless." The western slope of the Mount Diablo range, in the latitude of San Francisco, receives about an annual average of 20 inches of rainfall. Ellis, in the same latitude, on the eastern side of the same range, has but an annual average of 9 and 22-100 inches. Modesto, a few miles further south, on the opposite side of the San Joaquin, has but 8 95-100 inches. Still further south these averages continue to decrease, until, on the west side of Tulare lake, the annual rainfall cannot exceed three inches. The record of this point has been kept for so short a period that the amount cannot be stated positively, but applying to this section of the State the well-known

Laws Controlling Climate.

It will be found in time that this estimate is not far from correct. I have thought it of interest to condense some of the results of all these observations, as they show that considering the elements of disturbance in the facts that this State has, on one side, the vast Pacific ocean, presenting a uniformly radiating and absorbing surface, and on two other sides, vast tracts in the Colorado, Mohave and Nevada deserts, presenting rapidly absorbing and radiating surfaces. Yet California is controlled by the same universal laws that control climate in other places. A statement of some of these laws and the application of them to the records obtained of the temperature, prevailing wind,

and annual rainfall, it will be seen that until the isthmus of Panama sink beneath the ocean, and allows the Gulf stream to pursue its way into the Pacific, or some other great change takes place in the physical geography of the earth, the climate of any given section of this State is not exceptional, but just such as these laws show it should be.

Prof. Joseph Henry, in his "Contributions to Meteorology," has done so much to clear up the

Mystery of the Winds.

And has stated these laws so concisely, that it is a pleasure to quote from him. He says: "If the earth were at rest, it is obvious that the air expanded by the sun's heat at the equator would rise up and flow over, descending as it were an inclined plane towards the poles, where it would reach the earth's surface, and flow back to the equator, and thus a perpetual circulation would be maintained. It is further evident that since the meridians of the earth converge, all the air that rose at the equator would flow along the upper surface entirely to the poles, but the greater portion would proceed on further north or south than latitude 30°, for the surface of the earth contained between the parallel of this degree and the equator is equal to that of half of the whole hemisphere. Portions, however, in the northern hemisphere would flow on to descend at different points further north; and of these portions, some probably would reach the pole, and there sink to the surface of the earth, and from that point diverge in all directions in the form of a northerly wind. Between the two ascending currents near the equator there would be a region of calms or variable winds. The currents which flow over towards the poles, would descend with the greatest velocity at the coldest point, because there, the air would be densest. Now, the earth is in rapid motion on its axis from west to east, and every particle of air, therefore, flowing from the north to the equator, would partake of the motion of the place at which it started, and would reach in succession lines of latitude moving more rapidly than itself. It would therefore lag behind continually and appear to describe on the surface of the earth a slightly curvilinear course towards the west, and hence the northeast trades in the northern hemisphere and the southeast trades in the southern hemisphere—where the conditions are reversed, but both blowing towards the belt of greatest rarification. The particles of air approaching the equator will not ascend in a perpendicular direction, but will rise continually as they advance towards the west along an ascending plane, and will continue for a time their westerly motion in the northern hemisphere. After they have commenced their return towards the north, and until they arrive at parts of the earth moving more rapidly than themselves, they will gradually curve towards the east, and finally descend earthward to become again a part of the surface trade-winds from the northeast. The atoms will move westward as they ascend; 1st., on account of the momentum in that direction, and 2d., because as they reach a higher elevation, they will have less easterly velocity than the earth beneath. They will also be affected by another force, first pointed out by Mr. Ferrell, due to the increase of gravity which a particle of matter experiences in traveling in a direction opposite of that of the rotation of the earth. The last mentioned cause of deflection will operate in an opposite direction on atoms when they assume an easterly course. The result of the complex conditions under which the motive power acts in such a case would be to produce a system of circuits inclined to the west, the eastern portion of which would be at the surface, and the western portion at different elevations even to the top of the atmosphere. The greater portion of the circulation would descend to the earth within 30° of the equator, giving rise to the trade-winds; another portion would flow further north, and produce the southwest winds, and another portion flowing still further north would descend to the earth as a northwest wind. The air which descends in the region of the north pole would not flow directly southward, but on account of the rotation of the earth would turn toward the west and become a north-easterly current. It might appear at first sight that the north wind which descends from the polar regions would continue its course along the surface until it joined the trade-winds within the tropics; but this could not be the case on account of the much greater western velocity which this wind would acquire from the rapidly increasing rotary motion as we leave the pole. There would therefore be three distinct belts in each hemisphere—namely, the belt of easterly winds within the tropics, the belt of westerly winds within the temperate zone, and the belt of northwesterly at the north."

Without doubt these laws would operate uniformly if the earth were a perfect smooth sphere with a uniformly radiating and absorbing surface, but it is broken by mountain chains, covered by large tracts of desert which rapidly absorb and as rapidly radiate heat; about three-fourths of its surface is water, which slowly absorbs and as slowly gives up its heat; the water of the ocean is in circulation producing great currents which in this hemisphere carry a portion of the heat of the tropics into northern latitudes, and the cold of the north into warmer latitudes. All of these causes interrupt the uniformity of the

Flow of the Aerial Current.

Changes its temperature, and give rise, as well

as direction to local winds. The zones of tropical winds move bodily to and fro with the vertical sun, northward during our summer, and southward during our winter; the belts of westerly winds in the temperate zone move north and south with these. As California is within the northern temperate zone, it is primarily to the movement as a body, north and south, of this belt of wind, that we are indebted for our dry summers and winter rains, where, within the tropics, the northeastern and southeastern trade-winds meet, is a region of calms and rains. This belt of calms and rains, as has been stated, moves northward and southward with the sun's declination, where within the temperate zone the northern and north-westerly winds from the polar regions meet the westerly return trade-winds, is a region of storms and rains. These belts also follow the sun's declination north and south.

Applying these Laws to this Coast.

At our midsummer, the vertical sun would be on the Tropic of Cancer, and in that vicinity the northeasterly and southeasterly trade winds would meet, create ascending air, consequently calms; this air, laden with moisture, would rise into cooler regions, when a portion of its moisture would be precipitated, making tropical rains; this air would flow north and south towards the poles. Confining our view to that portion which would flow towards the north pole, the larger part of it must descend to the earth within 30° of latitude, under the law as stated by Prof. Henry; as in going north it continually has to pass over a portion of the earth which is moving less rapidly than the portion it has left, it is deflected and becomes a south-westerly wind. The greater portion of this upper current, having descended to the earth within 30°, and returned to join the trade-wind, the remainder would flow towards the pole, portions descending in its course at all points where the rarification of the air near the earth's surface would permit. These descending currents cause the local variable winds of our temperate zone, but the aggregate of all of them is the prevailing southwest return trade wind. The descending currents cannot give rain, as they can only fall to the earth when they become colder than the air near the earth's surface. In falling they are constantly arriving at places of warmer temperature than those they have left; they, therefore, change to a condition of taking up moisture rather than of parting with it. Where the great body of the descending return trade-wind reaches the earth between latitudes 25° and 35° must therefore on this coast be comparatively a rainless region.

Other lessening portions of the upper current would pass on until they met the prevailing northerly wind from the polar regions, when their temperature would be lowered and their moisture condensed, and fall as rain. The conflict of this descending current with the polar wind would create storms and give rise to electrical phenomena. The prevailing northerly polar wind reaches to about latitude 60° varied by the declination of the sun. This view of the causes of the tropical, temperate and polar zones of prevailing winds, is in accordance with the theoretical deductions of Prof. Ferrell concerning the course of atmospheric currents moving on a sphere, and appears to be confirmed by the belts of low barometer prevailing in the vicinities of the equator, and of latitude 60°. The polar wind being colder is heavier than the return trade-wind, and where they meet the tendency is for this polar wind to become a surface wind and prevent the upper current from reaching the earth, until it has been reduced to the same temperature.

The operation of these general laws can be

More Clearly Seen on this Coast

Than on that of the Atlantic and Gulf States. There, the northeast trade-winds are forced into the great cauldron of the Gulf of Mexico. The Cordilleras of Central America and Mexico form a wall against their progress, they rise, turn to the north as an upper current, and return to the earth as southwest winds. The Rocky mountains, one great chain of which extends from the center of the continent northwesterly to the Arctic ocean, assisting in the deflection. The great prairies extend in an unbroken line in the same direction from the mouth of the Mississippi to the same frozen ocean at the mouth of Mackenzie river in about latitude 62°. Prof. J. W. Foster, in his work on "The Physical Geography of the Mississippi Valley," states that the sources of the Mississippi river are but 1,600 feet above the ocean. Prof. Coffin has shown from the records in the Smithsonian Institute, in his article on the "Winds of the Northern Hemisphere," that between latitudes 60° and 66° there prevails a belt of easterly and northeasterly winds. These winds coming from the Arctic ocean meet the great chain of the Rocky mountains, are deflected into north-westerly winds and pass unobstructed along this great stretch of prairie land into the States east of the Rocky mountains. The conflict between the northwest polar winds, and the moisture-laden southwest wind from the Gulf of Mexico gives all the Atlantic States north of Florida, their summer rains. As far back as 1850 Prof. Espy, in his second report on meteorology to the Secretary of the Navy, without, at that time, more than suspecting the cause, reported, as the result of a long series of observations, that in the northern part of the Atlantic States the winds generally, in great storms set in from the north of east and terminated from north of west, and in the south-

ern part of the Atlantic States they set in from south of east and terminate from south of west.

The States east of the Rocky mountains are the great battle ground on this continent of these hot and cold winds. It is doubtful if the Atlantic trade-winds ever give rain to California. That portion which passes the mountains through the Valley of the Rio Grande precipitating its moisture on the White mountains and Black hills of Arizona, which, by the meteorological records of the Smithsonian Institute, are shown to have an annual average of 20 inches of rain.

Application of These Laws to California.

That these general laws may be applied to California as the cause of our climate, I will assume to follow a given portion of air along well-known points on the coast. At midsummer, at noon, the sun would be vertical in southern California, just north of Cape St. Lucas. In this vicinity this portion of air having been a part of the trade-wind would have become heated, and saturated with moisture. It would rise until it met colder regions, when it would part with some of its moisture; a portion would return to the earth within 30°, again to join the trade-wind, and another portion return towards the north as a part of the greater upper current.

Under the operation of Prof. Henry's law, the greater part must return to the earth between latitude 30° and say latitude 35°; the remainder would flow on towards the poles, until it met the prevailing polar northwesterly winds; at these points there would be fogs and summer rains. Wherever the polar wind forced its way south of this, it would condense the moisture of these descending trade-winds and give rain. This they would do until they had passed so far south that their temperature would be raised to that of the descending return trades, when, of course, no moisture could be precipitated. It is these polar winds, forcing themselves among the descending trade-winds, that give British Columbia, Washington Territory and northern Oregon their summer showers. Should they force themselves further south, they in their passage have to pass into warmer latitudes; they would also meet the heat of our great valleys and deserts, and become as warm as our prevailing summer wind, and therefore could not give California summer rains.

But from midsummer, the sun is for six months moving south, taking with him the great belts of the winds of the tropical, temperate and polar zones, until, at our midwinter, his rays at noon are vertical just north of the northern part of Chile in South America. These belts moving south with the sun during six months, the region of conflict between the polar wind and the variable winds, which in summer was over British Columbia, Washington Territory and Oregon, has now moved south over Oregon and the northern and middle parts of California. The temperature of the earth's surface, and the air in contact with it, have been lowered by the withdrawal of the sun's more direct rays, and the polar winds are permitted to reach further to the south without increasing their temperature. The region of calms and the southern limit of the variable winds have, of course, also moved south with the sun beyond the Tropic of Cancer. At this season, in the Pacific, the trade-wind is not usually found north of latitude 13°. When in winter the descending return trade-wind, coming from the southwest, meets the coast south of Cape St. Lucas, it is forced by the Cordilleras and the configuration of the main coast into the Gulf of California, and is deflected into a course from the southeast, or, to be more exact, as shown by the records kept by Dr. Gibbons, into a course from the south-southeast. Without doubt, the southwest trade-wind, which strikes the coast of Lower California in winter north of Cape St. Lucas, is deflected by the high mountains parallel to the shore, and also passes over our coast counties as a southeast wind. H. L. Warner, in a paper read before the American Association for the Advancement of Science, at its Baltimore meeting in 1858, was the first to note the fact, that the waters of the Gulf of California supply the moisture to the southeast wind that bears to us our rains. It may be objected that the Gulf of California has not sufficient area from whence could be delivered the great volume of southeast winds that at times, during our winters, flows over this State. The Gulf is not the cause of this wind, but it is the channel through which it flows and gives to it direction. When the sun is vertical on the coast of Bolivia, just north of Chile, at our midwinter, he has carried south with him the northeast trade-winds, until, as has been stated, they do not prevail north of about latitude 13°. The region of calms, where the great body of the upper current returns to the earth again to join the trade-winds, is at this season between latitudes 13° and 18°. North of this region of calms, at this time, those portions of the upper current which pass further north descend to the earth, under Prof. Henry's law, as southwest winds. At latitude 20°, the west coast of Mexico projects a bold headland into the Pacific ocean, known as Cape Corrientes. South of the Cape the trend of the coast for nearly 2,000 miles is east-southwest. North of this Cape, the trend for more than 100 miles to Mazatlan is north. From Mazatlan to the head of the Gulf of California, a further distance of 600 miles, it is north-northwest. The Sonora arm of the Cordilleras rises above the table land of Mexico at latitude 20°, and runs north northwest along the coast nearly to the head of the Gulf of California.

All of these southwest Winds that Strike the Coast.

From Cape Corrientes north to Cape St. Lucas, are deflected by these mountains and forced up the gulf as south-southeast winds. The United States Coast Survey have lately completed the survey of this gulf and parts of the Mexican coast, north of Cape Corrientes. When their record of observations of the course of the prevailing winds in winter, the barometric pressure and the temperature of the air and water is published, I feel confident that it will be found that the southwest return trades prevail in winter north of Cape Corrientes, and are turned by the mountains and the coast up the Gulf of California, and so over this State as our southeast winds. It comes from this gulf warm and laden with moisture and passes over the Colorado and Mohave deserts. These deserts, as shown by the meteorological records of the Smithsonian Institute, have a mean winter temperature of from 48° to 56°. This is not sufficiently low to precipitate its moisture and it passes on until it meets the Sierra Nevada and Coast Range mountains. In ascending these, it rises into cooler regions, finds a mean winter temperature of 40° and gives up some of its moisture. When it flows down into the southern end of the great valley of the Tulare, it meets a mean winter temperature of 48°, which is higher than that of the mountains it has just passed. It therefore retains its moisture and passes on, until it meets a cold polar wind and has another portion of its moisture condensed in a rain storm, or failing to meet this, passing still further north, until its moisture is condensed by the prevailing low temperature of a higher latitude. It is of frequent occurrence in winter, that a gentle southeast wind will blow for days, giving no rain south of the latitude of San Francisco, but cloudy weather at the northern end of the Sacramento valley and light showers and rains from Red Bluffs to Oregon. Therefore the northern part of the State should receive more rain than the southern and the mountains more than the valleys. The least rain should be in the hot deserts and on those sides of valleys most sheltered by mountains from the moisture-bearing winds. The first proposition that the northern part of the State should receive more rain than the southern, appears to be confirmed by the following exhibit of the

Rainfall in the Sacramento, San Joaquin and Tulare Valleys.

These, in fact, constitute one great valley. All of it has the Sierra Nevada on the east and the Coast Range mountains on the west. A line drawn through its center, in the line of the rain-bearing wind, south-southeast from Fort Reading to Sumner, would at all points be about an equal distance from the ocean and also an equal distance from the Nevada desert. All the stations relatively to their surroundings are, therefore similarly situated and general laws have full operation free from local disturbance. Commencing at the north end of the valley, the record is as follows:

Rainfall at North End of Valley of California.

Stations.	Latitude.	Longitude.	Height above ocean —feet.	Extent of series.	Annual mean of rain in inches.
Fort Reading.....	40° 30' 122° 05'	674	1852-56	20.11	
Red Bluff.....	40° 10' 122° 15'	307	1872-77	18.41	
Tehama.....	40° 122° 08'	222	1870-77	16.30	
Chico.....	39° 40' 121° 50'	193	1871-77	21.00	
Marysville.....	39° 21' 121° 30'	67	1871-77	17.46	
Sacramento.....	38° 34' 121° 28'	30	1840-77	18.75	
Stockton.....	37° 57' 121° 17'	23	1854-57 1871-77	13.23	
Modesto.....	37° 40' 120° 55'	01	1871-77	0.60	
Merced.....	37° 20' 120° 20'	171	1871-77	0.36	
Borden.....	36° 55' 120° 27'	187	1875-77	3.32	
Tulare.....	36° 14' 119° 18'	252	1875-77	4.83	
Delano.....	35° 43' 119° 12'	313	1875-77	4.03	
Sumner.....	35° 23' 118° 58'	415	1875-77	3.02	

Mountains have More Rain than Valleys.

The second proposition, that the mountains should receive more rain than the valleys, is also confirmed by the following exhibit, wherein have been selected successive stations on a line as nearly as possible east from San Francisco, thereby avoiding any increase of precipitation due to increase of latitude. The law, as stated by Guyot, deduced from experiment and observation, is that an elevation of 350 feet is sufficient to diminish the mean temperature of a given place by 1° of Fahrenheit; that is to say, the effect is the same as if the place were situated 70 miles further north.

Commencing near the center of the Sacramento valley, at the lowest elevation above the sea, the following results are shown:

Center of Sacramento Valley.

Stations.	Latitude.	Longitude.	Height above the sea—feet.	Extent of series.	Annual mean of rain in inches.
Stockton.....	37° 57'	121° 17'	23	1854-57	13.23
Sacramento.....	38° 34'	121° 28'	30	1871-77	18.75
Rodlin.....	38° 45'	121° 12'	249	1870-77	17.30
Auburn.....	38° 52'	121° 02'	1363	1870-77	20.70
Colfax.....	39° 06'	120° 55'	2421	1870-77	22.72
Alta.....	39° 12'	120° 52'	3612	1870-77	47.32
Emigrant Gap.....	39° 18'	120° 35'	5230	1870-77	51.49
Gisno.....	39° 19'	120° 28'	5539	1870-77	55.32
Summit.....	39° 20'	120° 15'	7017	1870-77	58.48

That the least rain should be in the deserts,

is confirmed by the records kept at various stations.

Commencing south and proceeding north, the following statement is shown:

Stations.	Latitude.	Longitude.	Height above Sea.	Extent of Series.	Annual mean of Rain, In.
Fort Yuma.	32° 44' 114" 36'	200 ft.	1855 to '67 1861 to '73	3.06	
Pt. Mohave.	35° 09' 114" 35'	604 ft.	1854 to '70 1863 to '73	2.05	
Wadsworth.	39° 42' 119" 15'	4077 ft.	1870 to '77	3.21	
Hot Springs	39° 51' 119" 02'	4070 ft.	1870 to '77	3.19	
Brown's	40° 00' 118" 35'	3925 ft.	1870 to '77	3.53	

The Great Deserts.

Fort Yuma and Mohave, on the Colorado and Mohave deserts, are in the zone where the great body of the descending southwest return trade-winds reach the earth. It has been shown that these descending currents cannot give rain, as, in falling, they continuously arrive at regions of increasing temperature. It is therefore in this zone, on both sides of the equator, that almost all the great deserts of the earth are situated, and primarily to this cause is their existence due. The Mohave and Colorado deserts are in the same latitudes north of the equator as the deserts of Sahara and Arabia. The great desert of the interior of Australia is in the same latitude south of the equator as the desert of Atacama in South America.

The stations of Wadsworth, Hot Springs and Brown's in the above table are in Nevada and in the region of variable winds, and are made desert by want of rain; but better illustrate the last proposition, that less rain should fall on the opposite side of mountains to that exposed to the moisture-bearing winds.

Rainfall on Mountain Sides.

For further illustration of the proposition: I have selected stations in different parts of this State and Nevada. *Fort Tejon*, latitude 34° 53' north; longitude, 118° 53' west, on the south side of the Tehachapi mountains, were the Sierra Nevada and Coast range unite, forming a wall against the southeast wind, has an elevation of 3,240 feet. From a record of five years, it has an annual mean of 19.53 inches of rain. *Caliente*, a station of the Southern Pacific railroad 30 miles northeast, elevation 1,290 feet upon the north side of this range, from a record of two years, has but an annual mean of 6.38 inches; and *Sumner*, 31 miles north of Tejon, with an elevation of 415 feet, receives but 3.92 inches. The Tehachapi mountains precipitate some of the moisture from the southeast winds and under the law as stated by Guyot, they descend into the valley dry and cloudless. The *Summit of Mount Diablo*—elevation 3,856 feet—from a record of two years, receives an annual mean of 20.85 inches. *Livermore*—in one of its valleys—elevation 485 feet, from a record of six years, has an annual mean of 13.28 inches; while *Ellis*, at its northeastern base, with an elevation of 76 feet, from a record of six years, receives but an annual mean of 9.22 inches. *Benicia*, at its northwestern base, elevation 64 feet, from a record of 13 years, receives an annual mean of 13.7 inches. This increase at Benicia shows an interference with the law which, I think, may be explained by the indraft of air into San Pablo bay from the Bay of San Francisco through the narrow channel, on the bank of which Benicia is situated. Gen. Myer, Chief of the Signal Service, in his circular on the practical use of meteorological reports, says: "That wind which in the ocean would blow with a certain velocity will have but one-half or one-third of that velocity, when blowing over a hilly country." While *Diablo* robs Benicia of its rain, it is, in part, compensated from the currents of moisture-laden air that flow up the Straits of Carquinez, in consequence of meeting with less resistance. The *Summit of the Sierra Nevada* where it is crossed by the railroad, as has been shown, receives an annual mean of 58.48 inches. *Boca*, 13 miles northeast in an air-line, but 1,484 feet below, on the eastern flank, for the same number of years, receives but an annual mean of 14.58 inches; and *Reno*, 31 miles in an air-line in the same direction, and 1,510 feet below the summit, and nearer the eastern base of this range of mountains, receives for the same time but an annual mean of 4.78 inches. There are two stations, one on each side of the Sierra Nevada, whose elevations above the sea are nearly the same—*Alta*, on the southwestern side, and *Brown's* on the northeastern. The first has an elevation above the sea of 3,612 feet, the latter of 3,925 feet. *Alta* received during a record of seven years an annual mean of 47.32 inches, and *Brown's* for the same period 3.53 inches.

Moisture-Bearing Winds.

Dr. Henry Gibbons has shown from his daily record of the climate of San Francisco, that whatever course the wind may have near the surface of the earth at this place, the upper currents of air, whenever their clouds could be seen, were moving from the southwest. The records of the station at the summit of the Sierra show the same fact. It is not uncommon that the Sacramento valley is filled with a southeast wind, it may be giving rain, while a cloud bearing southwest wind is blowing at the summit. When this southeast wind becomes a storm, it flows up the canyons, ravines, gulches and river courses as a southwest wind and joins this upper current, for the general course of all the ravines and river courses of the Sierra is from the northeast to the southwest, and the wind, like other fluids, takes the

course of least resistance. It is believed that an early fall of snow in the Sierra increases the rainfall in the Sacramento valley. There is not yet sufficient data to hazard a positive conclusion on the subject. All the moisture-bearing winds pass from the valley over this snow into the great basin of Nevada, therefore, an early fall of snow storing up a cold temperature would probably increase the subsequent fall on the Sierra. If it shall be found to increase the rainfall in the valley, the cause can be ascribed to the fact, that the belt of snow is a store-house of cold, lowering the temperature of the adjacent air, which, by increase of weight, flows down into the valley and lowers the temperature of the air at the lowest places in the valley. Tulare, near the shore of Tulare lake, which is the lowest point of that portion of the valley (the town being 282 feet above the sea), is at the base of the highest mountains in California. The cold air flowing down from these mountains reduces its winter temperature (December, January and February) to a mean of 45.57°, while Auburn, 158 miles further north, and with 1,087 feet greater elevation, situated on the long spur jutting into the valley which the railroad climbs to cross the mountains, for the same months, has a mean temperature of 46.70°, the mean of the winter at Tulare being more than one degree colder than at Auburn. Chico, 206 miles north of Tulare, and eighty-nine feet less in elevation, has a winter climate one and a quarter degrees warmer than Tulare, its mean winter temperature being 46.82°.

If it were not for the cold air from the mountains flowing to the lowest places in the valley, Tulare would be entitled to a winter temperature of 51° warmer than that of Auburn, two being due to decrease in latitude, and three and a half to decrease in elevation.

The coast counties are controlled by the same general laws that govern other parts of the State. There is more rain north than south, more on the hills than in the valleys, more on the south side of the hills than on their northern and eastern exposures. Their proximity to the ocean gives them a more even temperature than in the interior, making them cooler in summer and warmer in winter. From the sea coast to the summits of the Coast range of mountains, they are also subject to the

Influence of the Japan Gulf Stream.

This stream, according to Prof. Davidson, in the "Alaska Coast Pilot," "starting with a maximum temperature of 88° sweeps across the Pacific and about latitude 45° to 50° in longitude 148° divides. The main body stretches directly towards the coast of America, is deflected southward and eastward and runs down the coast of Oregon and California. A branch of this current continues direct to the Alexander archipelago, and striking the southern part of the coast, deflected to the northward and westward. It is the warm Alaska branch which causes the high isothermal lines that exist directly on the Alaska coast." The temperature of this Alaska branch, as observed by him in September, 1876, was from 50.06° to 47.01°, decreasing irregularly. The prevailing westerly winds of those latitudes, warmed by this gulf stream take from it moisture which is condensed into fog and precipitated in rain upon the coast, when they meet its glacial mountains and the cold air and water flowing down from them. The influence of this current in producing summer rains extends as far south as the Columbia river; the meteorological records of the Smithsonian Institute showing that, at the mouth of this river, there is a mean for the summer of six inches of rain, and an annual mean of 78 inches. At Sitka, as shown by the "Alaska Coast Pilot" from a record kept from 1847 to 1854 and from 1855 to 1864, the annual means is 82.66 inches. For the purpose of ascertaining the

Effect on our Climate

Of that branch of this gulf stream where it passes down our coast, I procured from Capt. Bradbury, the logs of 24 voyages of the Occidental and Oriental Co.'s steamers between San Francisco and Yokohama. These voyages were between November 16th, 1875, and December 26th, 1876. From these I have gathered the temperature of the air and water taken at noon for a distance of 900 miles west from San Francisco, and the temperature of the water for the same distance east from Yokohama. Yokohama and San Francisco being very nearly in the same latitude. These distances were selected on each side the ocean, because there is no marked increase or decrease in temperature either near San Francisco or Yokohama until these distances have been passed. There has also been gathered the temperature of the water in mid-ocean between these two ports; one series for each month at about latitude 42° and longitude 180°; and one series for each month at about latitude 32°, and longitude 180°. The steamers coming from Yokohama to San Francisco usually going north to 42°, and the steamer from San Francisco to Yokohama going south to 32°. The mean temperature of the water for a distance of 900 miles east of Yokohama for the year was 65.40°. The mean of the warmest temperature of the water for the year, was 65.16°. The mean of the coldest was 60.37°. The warmest on any day was September 7th, 1876—750 miles east of Yokohama, when it was 84°. The coldest was January 14th, 1876, at the same distance, when it was 49°. The means of the air and water, for each month, for a year for a distance of 900 miles west of San Francisco, are, as follows:

Continued on page 61.

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Alta.	24 221	22 205	19 186	17 160
Andes.	1 1.10	1.05	96	700
Alps.	9 51	77	61	51
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Excelsior.	45	45	45	45
Endowment.	500	1.30	90	1.30
Gen Thomas.	40	350	400	350
Grand Prize.	14	135	15	135
Gila.	11	1.40	1.20	1.10
Gould & Curry.	94	91	81	91
Hale & Norcross.	101	94	81	101
Hussey.	201	150	200	200
Julia.	2.40	1.90	1.1	1.10
Justice.	101	101	101	101
Jackson.	31	31	3.40	3.1
Joe Seates.	150	100	150	100
K. K. Con.	51	51	51	51
Kentuck.	250	200	200	200
Kossuth.	121	111	111	111
Lady Wash.	121	111	111	111
Leopard.	1.10	1.05	1.10	1.10
Leviathan.	400	350	350	350
London.	2.80	2.10	2.10	2.10
Modoc.	750	650	650	650
Manhattan.	111	111	111	111
Mendocino Valley.	111	111	111	111
Mexican.	111	111	111	111
North Con Virginia.	900	750	750	750
New York.	2.30	1.90	2.30	1.90
Northern Belle.	121	111	111	111
New Oso.	850	850	850	850
Nevada.	800	800	800	800
Occidental.	11	1.05	1.00	1.05
Ophir.	551	551	551	551
Overman.	251	221	221	221
Panther.	250	200	200	200
Raymond & Ely.	250	200	200	200
Rocks Island.	250	200	200	200
Sage.	121	111	111	111
Seg Belcher.	31	31	31	31
Sierra Nevada.	50	50	50	50
Silver Hill.	111	111	111	111
Sucon.	7	5	5	5
Solid Silver.	13	1	1	1
Star.	13	1	1	1
Trojan.	800	500	500	500
Union.	161	151	151	151
Utah.	161	151	151	151
Wells Fargo.	250	150	150	150
Woodville.	1.55	600	1.15	700
Yellow Jacket.	11	91	101	81

Sales at S. F. Stock Exchange.

Friday A. M., Jan. 18.	50 Utah.	132
225 Alpha.	150 Union Con.	132
1463 Alta.	150 Woodville.	750
375 Andes.	40 Yellow Jacket.	91
145 Best & Belcher.	130 Argenta.	1.10
140 Bullion.	600 Argenta.	1.10
240 Boyle.	300 Alps.	51
915 Benton.	300 Argenta.	1.30
95 Chollar.	300 Andes.	1.10
683 California.	300 Argenta.	1.10
1183 Con Virginia.	300 Bullion.	1.10
1230 Crown Point.	300 Best & Belcher.	1.10
1080 Con Imperial.	300 Benton.	1.10
100 Confidence.	300 Bodie.	1.10
530 Chollar.	300 Bodie.	1.10
500 Con Wash.	300 California.	1.10
30 Dayton.	300 California.	1.10
860 Excelsior.	300 Chollar.	1.10
300 Gould & Curry.	300 Gould & Curry.	1.10
170 Hale & Norcross.	300 Hale & Norcross.	1.10
405 Justice.	300 Justice.	1.10
400 Julia.	300 Julia.	1.10
615 Joe Seates.	300 Joe Seates.	1.10
100 Kentuck.	300 Kentuck.	1.10
735 Lady Wash.	300 Lady Wash.	1.10
400 Leviathan.	300 Leviathan.	1.10
300 Morning Star.	300 Morning Star.	1.10
100 North Con.	300 North Con.	1.10
175 New York.	300 New York.	1.10
730 Ophir.	300 Ophir.	1.10
240 Overman.	300 Overman.	1.10
600 Rock Island.	300 Rock Island.	1.10
450 Savage.	300 Savage.	1.10
370 Sierra Nevada.	300 Sierra Nevada.	1.10
100 Sucon.	300 Sucon.	1.10
400 Senator.	300 Senator.	1.10
100 Solid Silver.	300 Solid Silver.	1.10
100 Star.	300 Star.	1.10
100 Tiptop.	300 Tiptop.	1.10
100 Union.	300 Union.	1.10
100 Utah.	300 Utah.	1.10
100 Wells Fargo.	300 Wells Fargo.	1.10
100 Woodville.	300 Woodville.	1.10
100 Yellow Jacket.	300 Yellow Jacket.	1.10

Afternoon Session.	Monday A. M., Jan. 21.	100 Alpha.	111
1350 Argenta.	100 Alpha.	111	111
350 Bodie.	100 Bodie.	111	111
350 Bullion.	100 Bullion.	111	111
350 Best & Belcher.	100 Best & Belcher.	111	111
425 Benton.	100 Benton.	111	111
85 Belcher.	100 Belcher.	111	111
300 Bechtel.	100 Bechtel.	111	111
100 Bodie.	100 Bodie.	111	111
100 California.	100 California.	111	111
90 Chollar.	100 Chollar.	111	111
50 Crown Point.	100 Crown Point.	111	111
2125 Day.	100 Day.	111	111
125 DeFrees.	100 DeFrees.	111	111
850 Endowment.	100 Endowment.	111	111
135 Eureka Con.	100 Eureka Con.	111	111
500 El Dorado S.	100 El Dorado S.	111	111
1059 Gen Thomas.	100 Gen Thomas.	111	111
50 Gila.	100 Gila.	111	111
1000 Gila.	100 Gila.	111	111
925 Hale & Norcross.	100 Hale & Norcross.	111	111
530 Hornet.	100 Hornet.	111	111
2170 Hussey.	100 Hussey.	111	111
500 Independent.	100 Independent.	111	111
250 Jackson.	100 Jackson.	111	111
50 K. K. Con.	100 K. K. Con.	111	111
650 Leopard.	100 Leopard.	111	111
150 Leeds.	100 Leeds.	111	111
140 Manhattan.	100 Manhattan.	111	111
210 Mexican.	100 Mexican.	111	111
250 Modoc.	100 Modoc.	111	111
945 New York.	100 New York.	111	111
440 Northern Belle.	100 Northern Belle.	111	111
150 New Oso.	100 New Oso.	111	111
1350 Nevada.	100 Nevada.	111	111
400 Raymond & Ely.	100 Raymond & Ely.	111	111
100 Star.	100 Star.	111	111
50 Sierra Nevada.	100 Sierra Nevada.	111	111
80 Savage.	100 Savage.	111	111
530 Silver Prize.	100 Silver Prize.	111	111
1350 Tiptop.	100 Tiptop.	111	111

280 Savage.	107	101
600 Senator.	107	101
75 Silver Prize.	107	101
420 Trojan.	107	101
255 Utah.	107	101
475 Union Con.	107	101
30 Woodville.	107	101
1300 Wells Fargo.	107	101
340 Yellow Jacket.	107	101
1640 Argenta.	107	101
250 Alps.	107	101
490 Alta.	107	101
50 Belle Isle.	107	101
385 Bullion.	107	101
190 Belcher.	107	101
100 Belmont.	107	101
340 Con Virginia.	107	101
30 Crown Point.	107	101
175 California.	107	101
600 Con Imperial.	107	101
45 Chollar.	107	101
455 Day.	107	101
200 Eureka Con.	107	101
500 El Dorado S.	107	101
630 Grand Prize.	107	101
220 Gila.	107	101
385 Gould & Curry.	107	101
845 Golden Chariot.	107	101
335 General Thomas.	107	101
175 Hale & Norcross.	107	101
2880 Hussey.	107	101
100 Independent.	107	101
170 Justice.	107	101
230 Jackson.	107	101
500 Leeds.	107	101
100 Leopold.	107	101
625 Lady Wash.	107	101
1500 Modoc.	107	101
610 Mexican.	107	101
20 Manhattan.	107	101
300 Meadow Valley.	107	101
2275 Nevada.	107	101
245 Northern Belle.	107	101
30 New Oso.	107	101
1050 New Oso.	107	101
475 Ophir.	107	101
460 Raymond & Ely.	107	101
50 Rye Patch.	107	101
335 Savage.	107	101
60 Sierra Nevada.	107	101
1000 Silver Prize.	107	101
190 Star.	107	101
800 Tiptop.	107	101
245 Union Con.	107	101
70 Utah.	107	101
140 Yellow Jacket.	107	101
665 Alta.	107	101
60 Andes.	107	101
110 Bullion.	107	101
350 Belcher.	107	101
400 Best & Belcher.	107	101
625 Benton.	107	101
900 Con Imperial.	107	101
440 Crown Point.	107	101
70 Chollar.	107	101
140 Con Virginia.	107	101
500 California.	107	101
150 Chollar.	107	101
700 Con Wash.	107	101
115 Confidence.	107	101
100 Dayton.	107	101
165 Excelsior.	107	101
310 Gould & Curry.	107	101
420 Hale & Norcross.	107	101
450 Justice.	107	101
60 Julia.	107	101
120 Joe Seates.	107	101
200 Kentuck.	107	101
100 Kossuth.	107	101
150 Leviathan.	107	101
30 Leeds.	107	101
455 Mexican.	107	101
225 Morning Star.	107	101
150 New York.	107	101
100 Overman.	107	101
345 Ophir.	107	101
200 Rock Island.	107	101
140 Con Virginia.	107	101
495 Silver Hill.	107	101
640 Savage.	107	101
200 Senator.	107	101
50 Solid Silver.	107	101
300 Trojan.	107	101
120 Union Con.	107	101
120 Utah.	107	101
100 Ward.	107	101
200 Woodville.	107	101
500 Wells Fargo.	107	101
100 Yuba.	107	101
250 Alps.	107	101
210 Argenta.	107	101
1200 Alta.	107	101
300 Belle Isle.	107	101
100 Bodie.	107	101
575 Belcher.	107	101
100 Benton.	107	101
300 Belmont.	107	101
350 Con Virginia.	107	101
645 California.	107	101
65 DeFrees.	107	101
550 Day.	107	101
120 Excelsior.	107	101
120 Excelsior.	107	101
1350 Endowment.	107	101
310 Grand Prize.	107	101

SALES OF LAST WEEK AND THIS COMPARED.

Thursday A. M., Jan. 17.	Thursday A. M., Jan. 24.
75 Alpha.	1905 Alpha.
900 Alta.	727 Alta.
535 Andes.	900 Andes.
735 Belcher.	549 Belcher.
150 Bullion.	535 Bullion.
735 Best & Belcher.	150 Best & Belcher.
100 Baltimore Con.	215 Benton.
645 Benton.	100 Bodie.
2740 Con Imperial.	350 California.
490 Con Virginia.	300 Chollar.
2855 California.	2740 Con Imperial.
300 Chollar.	300 Chollar.
270 Chollar.	349 Chollar.
515 Excelsior.	515 Excelsior.
455 Gould & Curry.	929 Gould & Curry.
455 Hale & Norcross.	1010 Hale & Norcross.
1015 Justice.	11011 Justice.
540 Joe Seates.	150 Joe Seates.
190 Kentuck.	395 Julia.
1200 Lady Wash.	940 Lady Wash.
410 Mexican.	140 Mexican.
290 Monumental.	500 Modoc.
2250 New York.	2150 New York.
60 Overman.	200 Morning Star.
1760 Ophir.	554 Ophir.
20 Occidental.	100 Overman.
200 Rock Island.	325 North Con Vir.
120 Sierra Nevada.	350 Overman.
900 Sierra Nevada.	4804 Sierra Nevada.
335 Silver Hill.	335 Silver Hill.
550 Solid Silver.	550 Solid Silver.
1000 South Con.	700 South Con.
470 Senator.	470 Senator.
50 Trojan.	400 Union Con.
640 Union Con.	640 Union Con.
195 Utah.	140 Utah.
300 Yellow Jacket.	100 Yellow Jacket.

AFTERNOON SESSION.

295 Alps.	661
150 Argenta.	1.40
200 Bodie.	1.00
185 Bodie.	1.00
330 Best & Belcher.	1.00
100 Bechtel.	1.00
610 Bullion.	1.00
1080 Chollar.	1.00
1555 Con Virginia.	1.00
1075 Crown Point.	1.00
645 DeFrees.	1.00
220 Day.	1.00

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Belcher M Co	Washoe	12	1 00	Dec 17	Jan 19	Feh 7	J Crockett	419 California st
Bullion M Co	Washoe	6	1 00	Jan 22	Feb 25	March 18	J Gruss	418 California st
Chollar-Potosi M Co	Washoe	14	3 00	Jan 7	Feb 12	March 18	W E Dean	419 California st
Excelsior M Co	Washoe	12	1 00	Jan 17	Feb 20	March 11	J Gruss	418 California st
Gen Lee S M Co	Arizona	1	5	Dec 3	Jan 5	Jan 29	T E Atkinson	310 Pine st
Gould & Curry M Co	Washoe	32	1 00	Dec 17	Jan 23	Feb 13	A K Durbrow	309 Montgomery st
Hale & Norcross M Co	Washoe	57	1 00	Dec 13	Jan 17	Feh 8	J F Lightner	309 Montgomery st
Hill & Co	Washoe	5		Jan 5	Feh 7	March 18	J Gruss	419 California st
Justice M Co	Washoe	23	2 00	Jan 10	Feh 14	March 6	J S Kennedy	419 California st
Leviathau M Co	Nev	6	25	Jan 18	Feh 20	March 18	F E Luty	507 Montgomery st
Modock Con M Co	Cal	4	50	Jan 21	Feh 23	March 13	E F Dickens	327 Pine st
Mint G M Co	Washoe	20	10	Jan 3	Feb 7	March 1	D A Jennings	401 California st
Nye M Co	Nev	3		Jan 3	Feb 11	March 5	E H Brown	Stock Exchange
Ophir M Co	Washoe	30	1 00	Jan 19	Feb 26	March 18	O L McCo	419 California st
Rock Island M Co	Washoe	13	20	Jan 9	Feh 12	March 5	W H Clark	418 California st
Silver Hill M Co	Washoe	1	1 00	Dec 4	Jan 9	Jan 30	W E Dean	419 California st
Sierra Nevada S M Co	Washoe	32	50	Jan 3	Feb 7	Feb 28	W W Stetson	303 Montgomery st
Trojan M Co	Washoe	6	25	Dec 27	Jan 28	Feb 18	D Wilder	328 Montgomery st
Wells-Jacobs M Co	Washoe	28	2 00	Jan 12	Feb 22	March 2	J E Fane	419 California st
Woodville Con M Co	Washoe	4	25	Dec 23	Feb 25	March 23	J E Fane	419 California st

WIND MILL. One of the best made in this State for sale cheap on easy terms. Address, W. T. care of Dewey & Co., S. F.

Iron and Machine Works.

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HENRY S. SMITH.

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OF ALL KINDS.

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Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

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Manufacturers of all kinds of

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ALL STYLES OF FANCY HEAD BOLTS.

HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

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Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

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Flouring Mills, Saw Mills and Quartz Mills' Machinery constructed, fitted up and repaired.

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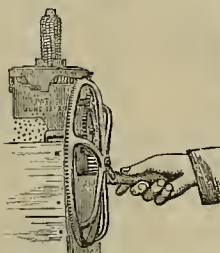
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Buy the Best.

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It is so cheap (costing only \$6), that almost any one can afford to buy one. It is so rapid, it will shell almost as fast as a \$40 machine, and seven or eight bushels per hour is not above its capacity. It weighs only 13 pounds and is simple and durable. For particulars, address

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Ballou M. Co.,
Con. Imperial M. Co.,
Gould & Curry M. Co.,
Best & Belcher M. Co.,
Crown Point M. Co.,
Belcher M. Co.,
Yellow Jacket M. Co.,
Sierra Nevada M. Co.,
Prospect M. Co.,
Baltimore Con. M. Co.,
Silver Hill M. Co.,
Dayton M. Co.,
Sutro Tunnel Co.

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Cost of Roasting and Chloridizing 20 Tons in 24 Hours by this Process:

One man.....	\$ 4 00
One man.....	3 00
Wood—2½ Cords at \$3 per cord.....	5 25
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Cost of 20 tons.....	\$52 25
Cost of one ton.....	2 61½

In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

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Ores worked by any process.

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INSTRUCTIONS IN ASSAYING,

Chemical Analysis, Determination of Minerals, and use of the Blow-pipe.

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For a small amount, in several claims on one of the

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Money needed for development. The ore will pay a handsome margin to ship to the city. Apply at this office.

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Established 1856.

We have just added a large amount of new machinery of the latest and most improved kind, and are again prepared to fill orders for Rope of any special lengths and sizes. Constantly on hand a large stock of Manila Rope, all sizes: Tanned Manila Rope; Hay Rope; Whale Line, etc., etc.

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The German Savings and Loan Society.

For the half year ending this date, the Board of Directors of the German Savings and Loan Society has declared the dividend on term deposits at the rate of eight and two-fifths (8 2/5) per cent, per annum, and on ordinary deposits at the rate of seven (7) per cent per annum free from Federal taxes and payable on and after the 15th day of January, 1878. By order
San Francisco, Dec. 31st, 1877. GEO. LETTE, Secy.

DIVIDEND NOTICE.

The California Savings and Loan Society, Junction Market, Edly and Powell—The Directors have declared a dividend of eight and two-fifths (8 2/5) per cent per annum on term deposits and seven (7) per cent on ordinary deposits for the half year ending December 31, 1877, free from Federal tax, and payable on and after Monday, January 7, 1878. By order
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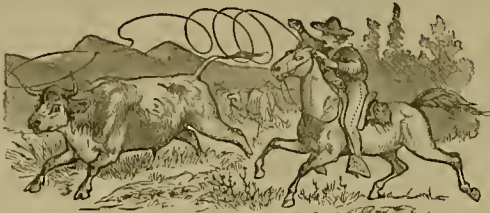
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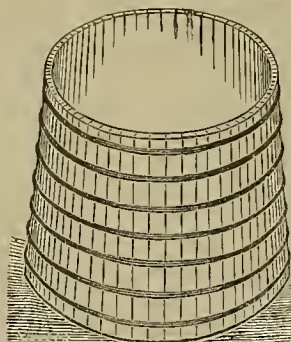
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South Overman Consolidated Mining Com-

pany.—Location of principal place of business, San Francisco, California. Location of works, Gold Hill, Nevada. Notice is hereby given, that at a meeting of the Board of Directors, held on the twenty-sixth day of December, 1877, an assessment (No. 2) of twenty-five (25) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, 323 Montgomery Street, Room 21, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twenty-eighth day of January, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the eighteenth day of February, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

DAVID WILDER, Sec'y.
Office, 323 Montgomery Street, Room 21, San Francisco, Cal.

Mariposa Land and Mining Company of

California. Location of principal place of business, San Francisco, California. Location of works, Mariposa County, Cal. Notice is hereby given, that at a meeting of the Board of Directors, held on the seventh day of January, 1878, an assessment, No. 13, of one (\$1) per share was levied upon the capital stock of the corporation, payable immediately in U. S. currency, to the Secretary, at the office of the company, room 33, Nevada Block, No. 309 Montgomery Street, San Francisco, California, or to the Assistant Secretary, at the office, No. 9, Nassau Street, New York.

Any stock upon which this assessment shall remain unpaid on the eleventh day of February, 1878, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the twelfth day of March, 1878, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

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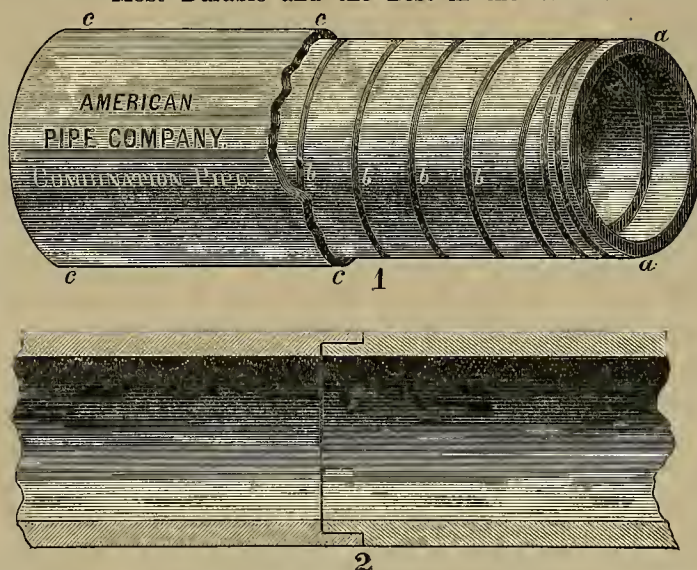


Fig. 1. View of Pipe. Fig. 2. Horizontal Section and Connection. aa Cylinder of Wood. bb Bands of Iron. cc Coating of Hydraulic or Asphaltum Cement.

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Of which 640 are secured by Government title and the balance by possessory title. It consists of

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An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, FEBRUARY 2, 1878.

VOLUME XXXVI.
Number 5.

An Important Improvement in Ice Manufacture.

A San Francisco Invention.

There seems to be no finality in science or in scientific mechanism. One improver comes after another in such swift succession, that each improver soon finds himself improved. A few years ago, the production of ice by artificial means was considered something quite wonderful, even taking into account the great cost attendant upon the earlier efforts. But by successive discoveries and improvements, the cost of the artificial production of ice has been greatly diminished, and the simplicity of the process so wonderfully advanced, that within the past year or two art has fairly superseded nature, even in the most favored localities, like New York, where the Ice King holds undisputed sway over river, and pond, and lake, for full one quarter of the year. To give some idea of the economic progress which has been made in this direction, it may be remarked that fifteen years ago, it cost nearly or quite \$20 to produce one ton of artificial ice; ten years ago the cost had been reduced more than one half, since which time the cost has been reduced from time to time, by added improvements, until by the machine herein described, pure crystal ice can be made at a cost not to exceed one dollar per ton.

For a century or more, the great problem has been to convert heat into power at the cheapest cost—as by the steam engine. The progress in this direction has been very slow and unsatisfactory. Much better success has been achieved in the solution of the later problem of converting power into cold by the ice machine.

The Latest Improvement.

However, and the one which entirely distances all others, is of quite a recent date, at least in its practical demonstration, and has been made in our own city of San Francisco, by Mr. J. F. Gesner, who has recently come hither from New York for the special purpose of putting into actual use a discovery which he conceived some three or four years ago in his little laboratory in the last named city. This improvement consists mainly in the employment and in the adaptability of machines for the employment, as a refrigerating agent, of

An Entirely new Fluid.

One scarcely known at all out of the laboratory of a fine chemist, and one never before employed as a refrigerating agent. The advantages of this fluid are manifold, some of which may be enumerated as follows:

1st. It is non-explosive, entirely safe and quite pleasant to the sense of smell.

2d. It is anti-corrosive, having no action, whatever, on any of the metals.

3d. Its condensing and evaporating points come nearer together than those of any other fluid known, an advantage which is readily appreciable to any expert in the manufacture of ice.

4th. It is exceedingly volatile and mobile, especially when placed under the action of the air pump.

5th. This last quality is, perhaps, its most important one, and is so perfect that while the ethers and the various lighter products distilled from petroleum, now in quite general use, as well as sulphurous oxide, compressed air, etc., have to be used in connection with a non-congealing liquid such as salt and water to intervene as a carrier or conveyer away of the heat from the water, this new liquid acts as its own carrier, and may be used in direct contact with the walls of the vessel containing the water to be frozen. This quality greatly simplifies and reduces the weight and bulk of the machine, and the whole process of artificial ice manufacture.

6th. This fluid condenses under from five to ten pounds pressure, while ammonia requires from 80 to 120 pounds, and the various other fluids in use vary from 40 to 50 and upwards all the way to the condensing point of ammonia.

7th. By reason of the low condensing point of the Gesner fluid there is great economy in the amount of power required over any other, while the machine itself may be constructed of lighter materials, as well as made lighter in weight. For the same reason there is less liability of leakage in the joints. In fact every joint

used in the Gesner machine may be held securely by ordinary soldering—a method which gives the cheapest as well as the tightest possible joint. Another advantage of a low condensing point is the less liability to leakage of the pump, around the piston of which, and from the high pressure required to condense other fluids, there is always much loss.

8th. The low condensing point of this fluid admits of its ready use in warm climates when other machines are either utterly impracticable or attended with great expense, especially in the use of power. It is not doubted but that one of these machines could be made to operate even in the lower levels of the Comstock mines, where the thermometer stands constantly at 120° Fahr. or even higher.

It would be useless to further enumerate the advantages derivable from the use of this new fluid in the manufacture of ice. Suffice it to say that the discovery of its application marks the most important era in the progress of ice manufacture, since the first introduction of a regular ice machine by Carre, some thirty years ago.

In order to give our readers some idea of the

condensed liquid collected in the condenser to the freezers; *L*, the pipe conveying the condensed freezing liquid from the self-acting valve to the freezing cells. These cells are fed at the bottom, as shown. *N*, the vacuum gauge; *O*, the pressure gauge; *P*, the driving pulley. In operation the water tank, *A*, is closed by a removable water-tight door in front, not shown in the engraving.

How Artificial Ice is Made.

For the benefit of such of our readers as may not be familiar with the theory and practice of artificial ice making, we will try to describe it. Ice is water deprived of a certain measure of heat. Now, if by artificial means we can take away that measure of heat from the water, we have ice. Put any very volatile fluid, such as ether or ammonia, in your hand and you will feel a strong sensation of cold, produced by the rapid evaporation of the fluid from the warmth of the hand—that is the heat is extracted from the hand by means of the evaporation which takes place. The quicker the evaporation, the more intense the cold. If now, the hand could be placed in a closed vessel and the air pumped

again converted into vapor, and so continue its regular round.

The process, as will thus be seen, is exceedingly simple, and all the more effective because the refrigerating effect is applied direct to the water, through the thin metallic walls of the containing cells. No other liquid known, than the one here used, will do its work in the manner described. All other liquids except this, require the intervention of a non-congealing liquid, such as salt and water, or glycerine and water, etc., which must be provided for by extra machinery, and at a considerable loss of power and refrigerating effect.

We are pleased to state that a company has already been organized in this city to build and operate one of these machines here. The cost of one with a capacity for making 50 tons of ice per day, including the right, to use for a corresponding amount of territory, would be about \$50,000, including steam engine.

A small machine, merely to demonstrate the principle, has been in operation for several months at Klemm's Lounge Factory, on Brannan street, between 5th and 6th, where it has been examined by a great number of our citizens, who are curious or interested in such matters.

For Refrigerating Purposes.

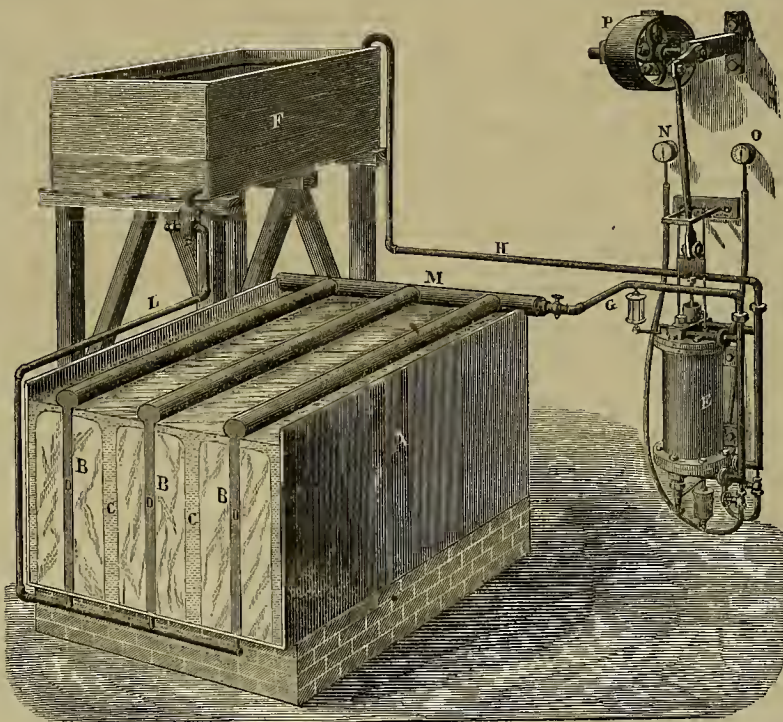
This machine, or rather this fluid employed in a very simple manner—a modification of the ice machine—is most admirably adapted for cooling purposes, for cars, breweries, cooling houses for fruit or meat, for skating rinks, etc. For refrigerating cars, its lightness and simplicity render it peculiarly applicable. It may be employed for a single car or for an entire train. There is no method known by which the same degree of cooling effect can be produced in so compact a space, with so little weight or such small expenditure of power as in the use of one of these machines. Arrangements are now being made for the construction of a large skating rink, cooling house, etc.

Ice has now passed out of the category of luxuries to take its place among the necessities of life, and the natural supply being so uncertain and difficult of attainment to the great masses of our population, we hail with pleasure this new improvement for producing it more cheaply, and all the more because it is placed to the credit of the already long list of valuable California inventions. Letters patent for this invention have already been obtained through the MINING AND SCIENTIFIC PRESS Patent Agency, and other patents are now pending. Any further information in relation to the above may be obtained by communication with this office.

NEW DIGGINGS.—And now comes Santa Monica, Los Angeles county, with a great excitement, which we hope will pan out better than those of most of the southern counties of the State, but have our doubts. A dispatch from there dated the 29th ult. says: Considerable interest is being felt here in a report quietly circulated that gold has been found in the hills near by, under circumstances that promise material results. A nugget of sufficient size was found to induce further exploration, which has developed gold in paying quantities. The prospectors are reticent as to their location, but enough has leaked out to set the people on anxious inquiry. An expert of undoubted reliability has declared the fact that gold in paying quantities exists here between Point Dume and Santa Monica.

THE BELCHER.—At the annual meeting of the Belcher mining company this week the following trustees were elected without opposition: James Newlands, A. K. P. Harmon, J. D. Fry, R. F. Morrow and J. H. Dobinson. James Newlands was elected President, John Crockett, Secretary, and H. N. Smith, Superintendent. The financial statement of the mine is briefly as follows: The mine was in debt at the last annual meeting, \$88,000. Since then it has produced \$414,000 in bullion, \$407,000 from assessments, and \$77,000 was paid to it by Crown Point on joint shaft account. The disbursements have been all the above, or \$986,000, and \$48,000 besides, the last sum being the amount the company is in debt now to the Bank of California.

A MINER named Wm. Callicoat was killed on Friday last by falling down the pump compartment of the main shaft of the Gould & Curry mine.



GESNER'S ICE MAKING APPARATUS.

simplicity of this machine, we have prepared the accompanying illustration. The simplicity of this machine over any other ever before constructed will be at once apparent to every one at all acquainted with the different machines for manufacturing ice. While it may be worked on the largest possible scale, it is also peculiarly adapted, from its simplicity of construction, for operation on a small scale of from one to three or four tons per day or less.

By reference to the engraving, the arrangement of the machine will be understood. *A*, water-tank in which the ice is made; *B*, ice in process of formation; *D*, the freezers or cells in which the freezing liquid is placed, and against which the ice is formed; *C*, water; *F*, condenser filled with water, through which a coil of pipe passes from *H* to *K*, and in which the freezing liquid is condensed; a larger coil may be used with a spray, if desirable; *M*, the gas chamber, which is connected with all the freezing cells; *G*, the pipe connecting the gas chamber with the vacuum side of the pump and through which the gas is drawn off for condensation; *E*, the pump, double-acting; *H*, the pipe connecting the condensing side of the pump with the condensing pipe coiled in the tank *F*; *K*, a self-acting valve which passes the

out of the same. the ether would evaporate much more rapidly, and the hand would be frozen. If a cup half full of water be placed in a vessel and another cup filled with ether be placed within the cup of water, the two placed under the receiver of an air pump and the air pumped out, the evaporation is so rapid that the water is quickly converted into ice.

This is precisely the principle of artificial ice manufacture. In the machine herewith shown, the cells *D*, *D*, *D*, are partly filled with the highly volatile fluid described, and the air pump, *E*, is put in motion to remove the air and vapor from the cells. The rapid evaporation thus produced causes the water in contact with the outside of the cells to freeze, as shown at *B*. The ice gradually accumulates until it reaches the desired thickness, when by a simple device the ice is separated from the walls of the cells, slid out of the tank and cut up into blocks suitable for the market. As the vapor is pumped out through the pipe, *G*, the pump being double-acting, it is forced, under pressure, through pipe, *H*, into the coil not shown, but placed within the tank, *F*. Here the pressure reduces the vapor again to its liquid condition, when it passes on, automatically, through the valve, *K*, and pipe, *L*, into the bottom of the cells *D*, *D*, *D*, as shown, to be

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents—Eds.

The Eclipse Mining Company.

EDITORS PRESS:—Will you do me the favor of publishing the following in answer to a statement made at the last meeting of the Eclipse gold mining company, as reported in the London Mining Journal of December 22d, 1877. The statement is mischievous, and if uncontradicted is very likely to prove injurious:

The Eclipse mine, as of course you know, is in Inyo county, California, and is a most valuable property. Mismanagement and carelessness on the part of the home directors have resulted in the collapse, for which I, being several thousand miles away, am made the scapegoat. Two facts in reply to the imputations of incompetency and dilatoriness.

From April to August of last year I kept the mine constantly running under the burden of law suits, attachments, labor troubles and want of funds. Statement after statement of how matters stood was forwarded to the home office, to none of which I received a reply. Everything went on from bad to worse until, despairing of relief, and literally unable to obtain credit, I saw the Sheriff in possession and was compelled to leave for San Francisco. Even here I have heard nothing from headquarters, and it was only from the chance remark of a third party that I learned of the reported liquidation. In the second place, I have simply to say that statements were forwarded to Finsbury Circus regularly as possible under the existing circumstances at the time, and have since then kept them informed of vital matters relating to the mine, etc.

The foregoing is in answer more particularly to that portion of the Secretary's report, as copied in the journal referred to above, of which I extract the following:

"Mr. Nelson who had been sent out had proved of no service whatever, and he (the Secretary) had never been able to obtain any information from him relative to the accounts."

In conclusion I would add that if English capital invested as this had been, if properly managed by the officials at headquarters, shareholders would have obtained ample returns for their money invested and the blame of non-success is attributable to them (Directors) and not to their representatives on this side of the Atlantic. Although still these representatives here can but say that every assistance has been offered for their welfare, but they have not thought it worth while to avail themselves or appreciate the same.

C. S. NELSON.

Eclipse G. M. & Q. Co., Inyo Co.

The Report of the Meeting.

A special general meeting of shareholders was held at the offices of the company, Finsbury Circus, London, on Wednesday, Mr. Potts in the chair, to consider the present position of the company and the desirability of a voluntary winding up. The Chairman said the Directors had called the present meeting in order to lay before the shareholders such information as Mr. Rickard had sent over, relative to the position of the property. The Directors had delayed calling the present meeting in the hope that Mr. Rickard would have returned from America, and been present, in order to state the fullest particulars regarding the property. Unfortunately, Mr. Rickard had not returned, having been engaged in some mining speculation in America. After the letters of Mr. Rickard had been read, perhaps some of the shareholders might think there was a ray of hope with regard to prosecuting the mine, but they had spent money without any return, that possibly they might not think it worth while to go in any further. He might mention that himself and Mr. Wild did not intend to advance any more money and Mr. Hulbert had also lost heart. That being so, there was only one course, to wind up voluntarily and appoint liquidators. As regards the accounts, the Secretary would be able to render an account with regard to England, but it has been utterly impossible to get any reliable accounts whatever from the other side.

The Secretary then read extracts from the most recent letters from the mine, showing the present unfortunate position of the property and the utter impossibility of continuing operations unless further money was forthcoming. The Secretary also mentioned that a debenture holder in this country had already lodged a petition for the compulsory winding up of the company. The Secretary, in answer to questions, said it would take about £5,000 to pay off the present indebtedness, but it would leave no capital to go on with and they would require another £5,000 to develop the property. Some time since a telegram was sent over from here, saying that funds were required to release the property; and in answer to a question as to how much it would take, the reply was \$4,000. A sum of £800 was subscribed and sent over to enable the property to be released, but it was afterwards found that considerable more than that amount was required, as the £800 only went a small way towards paying the workmen and such like things. Mr. Nelson, who had been sent out, had proved of no service whatever, and he (the Secretary) had never been able to obtain any information from him relative to the accounts. A shareholder said, it was

clear that unless a certain sum of money could be raised, it was utterly impossible to continue operations at the mine. The property was mortgaged to secure the debentures, which were a first charge upon it. It is impossible to raise money in operations. The proper course to pursue would be to direct the Board to place the company in a proper condition for liquidation. A lengthened conversation ensued, in the course of which several legal points were raised, which were replied to by the solicitor. Eventually it was decided to liquidate the company voluntarily, and Mr. I. H. Taylor and Mr. Bluett were appointed liquidators.

Poisoned Arrows.

EDITORS PRESS:—Entomological investigation is now receiving special attention at the national capital, and at the last two or three meetings of the Philosophical Society here, papers have been read on the subject of poisoned arrows. At the meeting of the Society held on the 22d of December, Maj. Powell advanced the belief that poisoned arrows were not and had not been in use by any of the American aboriginal tribes. At the last meeting of the Society, Dr. Elliott Cones, Secretary of Prof. Hayden's Geological Survey, made some remarks on the subject, based on his own observations as a surgeon in the army, having, on frequent occasions, while stationed at military posts in the Indian country, dressed wounds inflicted by poisoned arrows used by Indians, on soldiers and others. Dr. Cones was also fortified by many facts, placed in the form of notes by Dr. Hoffman, of the Hayden Survey, based on his own experience, coupled with many illustrations obtained from other reliable sources.

During the time of Dr. Hoffman's residence at the military station at Grand river, D. T., in 1872-3, as Post Surgeon, he devoted most of his spare time to the study of the language of the Dacotahs, in addition to observations upon their customs, ceremonies and the mode of manufacturing weapons, implements and utensils. The whole number of names upon the rolls at the Agency here amounted to 13,500; 8,500 of this number avoided the settlement and were known as "hostiles." The remaining 5,000 lived in various localities, at from five to 40 miles from the agency. As most of these encampments were permanent, frequent excursions were made to some of them.

As the custom of poisoning arrows is not in general use in this day of firearms, a description of the mode of preparing the poison and its subsequent application to the arrow points will be of some interest.

The arrow-maker and the owner of the weapons go to one of the numerous prairie-dog towns, in and about which rattlesnakes (*Candisona confluenta*), say, are to be found. One of the Indians is armed with several sticks, each from three to four feet in length, some of which are forked at one end; likewise the liver of an antelope or deer, usually the former, as they are more easily procured. When a rattlesnake is found, its escape is prevented by being gently but securely held to the ground by means of one of the forked sticks, which is placed about the middle of the body. The other Indian now impales the liver upon a slightly pointed stick, and by thrusting it at and teasing the snake, the latter becomes enraged and buries its fangs repeatedly in the liver. When the reptile has exhausted itself or refuses to bite any longer, it is killed. The liver is then carried back to camp and there placed upon a pole for exposure to the rays of the sun to hasten decomposition. This usually takes place in the course of a day, the actual length of time depending upon the state of the atmosphere. After the liver has become putrid, it is carefully taken down, put into a small vessel, where it is crushed and beaten into a plastic mass. The points of the arrows are then dipped into the viscid scum which accumulates upon the surface, after which they are allowed to dry. Finally they are placed, point downward, into one of the compartments of the quiver, reserved for poisoned arrows, and secured about the top with an extra thong, so as to prevent mistakes in their use. The other portion of the quiver contains the ordinary arrows employed in the chase.

A bow and quiver of arrows always forms a part of a warrior's outfit, and these are frequently brought into requisition on account of the noiseless manner in which they can be used. Whether the fatal effects of poisoned arrows are due to the presence of the venom, is a subject that requires investigation. The opinion of Dr. Hoffman is that the venom plays a very important part. The fact that the Indians have vegetable antidotes, and understand their application and effects, illustrates that they learned the fatality of the bite of the *Candisona*, and their ultimate employment of the venom as a toxic agent upon their arrows.

The Coyotero Apaches in the vicinity of Camp Apache, Arizona, are also known to occasionally use poisoned arrows. The Indians at this place exhibited many arrows which they said were poisoned, and it was perceived that the base of the arrow head in each case was covered with a dark brown, gummy substance, which was absent in the ordinary types. Dr. Milan Soule, who was for several years Post Surgeon at the above named locality, states that this sub-tribe of Apaches sometimes use poisoned arrows.

Dr. Elliott Cones, of the U. S. Army, furnishes, among others, ("Medical and Surgical Reporter," Vol. XIV, pp. No. 17, 321-324), an in-

teresting case of an arrow wound, which, on account of its peculiar progress and fatal termination, was, very justly, considered by him to have been a poisoned one. This case also was observed in Arizona.

Mr. James Stevenson, of Prof. Hayden's Survey, states that the Crows, Blackfeet, Assiniboines and Northern Dacotahs poison their arrows. The latter named tribe has already been alluded to. The other three prepare their poisoned arrows in the following manner, viz.: A rattlesnake is secured, and so tantalized or provoked that it will bite a piece of smooth wood or bark held by one of the Indians, after which the arrow points are rubbed upon the venom, and allowed to dry. The venom, just after it has been deposited upon the bark, is semi-translucent, and of a glutinous consistency. Frequently the heads of rattlesnakes are kept on hand for future use, when the poison sac can be extracted, and the venom utilized as required.

Prof. F. V. Hayden substantiates the above statement, and in addition says that these operations could be seen whenever there was any considerable gathering of Indians, such as when making the necessary preparations for a grand hunt, or a hostile expedition.

The very reason that some of the quivers are divided into two partitions, one of them as the receptacle for so-called poisoned arrows, is sufficient to show that these Indians apply some substance intended to insure the death of the subject upon which it may be used.

Some of the "Diggers" living in the upper portion of California are known to use the juice of the wild parsnip, mixed with the putrid liver of a dog. Mr. W. H. Dall, of the U. S. Coast Survey, has observed that the natives living in northeastern Siberia poison their weapons by dipping them into the putrid liver of the white bear. The liver is said by Mr. Dall, to be poisonous even when fresh. The natives use their poisoned arrows in the destruction of beasts of prey, and other animals whose flesh is unfit for food, such as wolves, foxes, etc.

The use of the woorara poison by some of the South American Indians is a well known fact. Schombergk says: "The woorara or ourara poison is prepared by the Makosio Indians from the pirarira and by the Warpeshanes of the Eonoco mountains on the Orinoco from a new strychnos, toxifera." N. H. Schombergk; strychnos toxifera; foliis ovato lanceolatis, acuminatis, 3-5 nervis utrinque ramulique ferrugineo tomentosis, bacca polysperma (Oken's Isis, hd. xxxi, 1835, p. 100.) ["The Lond. and Edin. Philosophical Mag. and Jr. of Science," vol. x, 1837, p. 72.]

It was at one time supposed that the origin of venereal diseases was due to the poison employed in the destruction of fish and game. In this connection Dr. Rees (The Cyclopaedia, or Universal Dictionary of Arts, Sciences and Literature, by Abraham Rees, etc., Phila., vol. 1, under the title of "America,") says: "It has been pretended, that the flesh of fish intoxicated with the cururu, ape and the flesh of the game killed with arrows poisoned with a species of woodbine called woorara, produced this contagion among them." This quotation has reference to the West India Islands, the Caribbees, Florida, Mexico and Peru. Mr. Rees further states that "In the Island of San Domingo, where the venereal disease was extremely rife, the use of poisoned darts was not in practice as among the Caribs and several families on Terra Firma."

Sufficient evidence has been obtained to illustrate the fact that poisoning arrows is still practiced by tribes within the limits of the United States, without having to hunt elsewhere to show that such customs exist or ever did exist.

Washington, D. C., Jan. 21.

Mines or "Prospects."

Why does the *Citizen* persist in calling Conelly's mine the Guanajuato, when the owners call it the Whana Whata, the Whana Uhata, and other names? It has been incorporated as the Wana Juata—they knew there was a "Q" in it somewhere. There has been such a clashing of cymbals and tooting of horns over this location that there is danger of California thinking that Arizona considers this phonetically named mine the biggest thing we've got. Some of us fellows, who have never seen it, are beginning to think its owners are developing their bonanza with gas rather than with blasting powder. We have no doubt it is a pretty good property, but there has yet occurred nothing that gives it rank, even among our third rate mines. There has been no reason in the laudatory spasms of the Los Angeles papers—unless they got some of the stock. Solid silver from it was shipped to San Francisco in sacks and boxes—and proved to be chiefly manganese and magnesium. Assays were promised of thousands of dollars per ton—results gave only hundreds. Of two lots, one assayed 138 ounces and the other about 200. Such things hurt the country. When a man tries to interest capital in a really meritorious property, he is forced to prove that it is not another phonetic Guanajuato. This premature puffing of mere croppings has always injured mining districts. The proper time for blowing and flourish of trumpets arrives when a mine has been passably opened, is turning out hullion and has something in sight. Then it is safe to let the eagle scream a little. Puffing croppings is like blowing up a bladder; too much inflation bursts the outfit. We have good mines enough to boast of, without wasting ourselves on good places for dumps.—*Arizona Sentinel*.

Eastern Oregon Mining Prospects.

A correspondent of the *Idaho Avalanche* says: If past endeavor may be considered an earnest of future attempt, eastern Oregon has much to expect during the coming year, from the labors of the prospecting miners scattered throughout her territory. Evidence of the efforts made by these fortune hunters to unearth the treasures concealed in our mountains, streams and gulches abound on every hand. Indeed, the long ditches, deep shafts, wide cuts and giant piles of quartz and gravel speak more eloquently on their behalf than anything I could hope to write. If faith, hope, energy and industry were of themselves sufficient to the complete development of our mineral resources, a prosperous future for this section of the country would be insured. Apart from what has been done during the past year in the way of placing our quartz mines on a paying basis, through the agency of these attributes alone, much that is worthy of notice has also been accomplished in the way of opening the placer claims of Baker and Union counties. As far as the yield of gold from quartz is concerned every miner knows that it must depend in a great measure on the caprice of capital, if that essential can be called caprice. But with surface diggings it is different. Fortunately for their development, capital is not in all cases required, and much can be accomplished by individual effort where corporate action would be essential to the successful working of quartz. Given a fair prospect, a decent "grub stake" and any possibility of getting water on to the claim, the average miner will, in nine cases out of ten, have a ditch on to the premises if nerve and muscle will do it.

Despite the scarcity of water, there has been much activity displayed in all our placer fields during the season of '77. From Pocatontas, Auburn, Clark's creek, El Dorado, Malheur, Mormon Basin and Rye valley returns are reported commensurate with those of more favorable seasons. Here on Snake river and in the vicinity of Burnt river some 20 claims have been opened, paying all the way from \$2 to half an ounce per day to man. Foremost among the enterprises of this kind that have occupied the attention of the public must be placed the successful termination of Mr. Thomas Huffman's project to bring Douglas Bar near the mouth of Connor creek, under the potent influence of a bydraulic head. This Bar is said to be one of the richest spots on Snake river. Judging from external appearances it may be appropriately termed a foothill of the Snake river mountains, lying as it does at the very foot of the range, with no apparent line of demarcation between the wash gravel of which it is constituted and the talcose state of the ridge it borders. Taking as a point of departure the left bank of Connor creek it extends in a northerly direction a mile from that stream, and has an average width of 150 yards. The subsidence of Snake river from this, its old channel, to its present bed, has left the surface of the bar at an elevation of 200 feet above the level of that stream. The mean depth of the gravel is 15 feet. Before attempting to bring water on to the ground Mr. H. prospected it carefully at different points and was encouraged to proceed from the flattering nature of the prospects discovered. Satisfied of its richness, nothing remained to be done but to introduce the water to make it a source of revenue. The way was not clear, however. There were obstacles to be met and overcome. With the resolution of an old-timer Mr. H. set to work, confident that the attainment of his end would fully compensate him for the outlay of time and trouble. He was met at the outset with more claimants to the water, as he expressed it, than you could shake a stick at. By one means and another, however, he succeeded in acquiring the title and started to excavate his ditch in August last. Much of its course lies through hard rock, and blasting had to be resorted to. A half mile of the distance had to be flumed, and 17,000 feet of lumber were used for that purpose alone. Nearly \$3,000 were paid for labor and the result of this expenditure of time, and thought, and labor and money is a conduit three miles long with a capacity for 300 inches of water, which will have a fall of 125 on to the ground, that has yielded as high as \$2.50 to the pan. Mr. Huffman has just received an offer of \$8,000 for the property.

Messrs. Grayson, Woods & Thompson own a claim embracing 1,000 feet of this bar and with commendable industry and prudence are energetically pushing a drift across their property to test the value of the same.

On Connor creek, near the site of the old Sleeper mill, Frazer, Way & Bohena are attempting to reach bedrock. An incredible amount of work has been done at this claim and, from present indications more remains to be done before bedrock is reached. Good prospects have been found from the surface down for a depth of 30 feet. Recently a derrick has been erected which will facilitate the handling of the boulders encountered. The Connor Creek mill and mining company are running 15 stamps, crushing 27 tons of ore per day of 24 hours and are reported to be cleaning up at the rate of \$7,000 per month. Only eight miners are employed.

A MAN who recently went to the Black hills, wrote back to his friends as follows: "Offer a premium at your next fair for the biggest fool in the country and I will try and get there in time."

MECHANICAL PROGRESS.

Hints for Iron Melters.

The man who prepares and charges the cupola in a foundry holds the key to the production of good castings, no matter how successfully the molder may do his work. It is important, then, that all melters should study their business and learn what are the points of success. In the course of an able series of articles on iron-founding, which Edward Kirk is writing for the *Iron Age*, we find the following hints on the work of the melter: The practical and scientific melter is the melter who understands his business and attends to his business; he chips out his cupola, and daubs it up in proper shape; he puts up the iron bottom and sees that it fits close and solid and is properly supported; he puts in the sand-bottom, and sees that it is packed solid and even, and has the proper pitch, without any hills or hollows in it; he puts in the front so that it never blows out, and he sees that the spout is in proper shape; he always has the tapping bars drawn down to a sharp point, so that he can tap with ease, and have the tap-hole large or small; he has his bod clay thoroughly mixed, and his bod-sticks always handy and in good shape. When he wants to stop-up he takes the bod-stick and sees that there is a bod on it in proper shape; he then puts the bod right over the tap-hole and gives it a sudden downward pressure, and stops the iron with ease. He puts in the shavings to light the fire with, and sees that they are properly spread over the sand-bottom, so as to light the wood evenly—the wood is cut short and split, and every piece is laid in the cupola in proper shape, so as to give the fire the best possible chance to burn and light the coke or coal evenly; he selects a few small pieces of coal or coke that will light easily, and puts them in on the wood; he then puts in the bed. If the cupola has a good draft he puts in all of the bed before the fire is lit, if the cupola has a poor draft, he only puts in part of the bed before the fire is lit, and the balance after the fire has got thoroughly started. He sees that the bed is evenly burnt and level on top before the iron is charged; he charges the iron compactly together, so that it will get the good of all the heat from the fuel; he sees that every charge of iron is level and even on top when all in; he sees that every charge of fuel is properly distributed over the iron, so that it will melt the next charge of iron properly, and at an even temperature; he increases or diminishes the amount of coal or coke in the bed, or between the charges of iron, at the rate of 25 or 50 pounds at a time, until he finds the exact amount required; he increases or diminishes the amount of iron on the bed, or in the charges, at the rate of 100 pounds at a time, until he finds the exact amount of iron that can be melted in that particular cupola with the smallest percentage of fuel; he then continues that charging without any variation; if he gets in a poor lot of fuel, he may increase the bed and charges of fuel a few pounds; or, if the fuel is extra good, he may decrease a few pounds, but always with caution and safety; he watches the direction the wind blows, and notes the effect that a north, south, east or west wind has upon the draft of his cupola, and he lights his fire accordingly, so as to have the bed burnt as near alike every day as possible; he inspects the blast-pipe and tuyeres every day to see that there are no holes in the pipe through which the blast may escape, and to see that the tuyeres are in proper shape, so that the blast will not escape up behind and through the lining, in place of through the stock; he notices the exact effect of the blast upon the cupola, and he knows when he is not getting enough blast, and at once complains to the foreman or engineer; he looks around the shop, toward the last of the heat, and sees or asks the foreman how much more iron is wanted; he then looks into the cupola, and if he thinks there is not enough iron in to pour off with, he throws in a little more, before the stock gets too low to melt it. The practical and scientific melter does everything according to rule, and not by guess, and the foundrymen can depend upon him having good, hot, clean iron every day, if it is possible to make it in his cupola.

Notes on Concrete.

Concrete in this State is widely used for foundations and for other building purposes. The following hints from *Seward's Journal* will be found valuable: Much harm is done, time wasted and annoyance caused by the habit of inexperienced persons picking and poking at cement samples of work, before it has had time to get strength. To such persons quick-setting, light-weight cements would appear to promise good results; but it is now well known by every one practically acquainted with the use of cement, that the well-burned, heavy, finely-ground, slow-setting concretes, are the best for concrete purposes.

The water for mixing concrete should be clean. It is possible to destroy much of the strength of cement by using dirty or polluted water. Sea water has not been found injurious, but it is supposed to delay the setting. Respecting the quantity of water to be used there is more danger to be apprehended from using less than from using more than the right quantity. The correct quantity of water is of course sufficient to convert the cement into a thin paste, that shall completely coat and

causo to adhere all the particles of the aggregate.

Concrete mixed by hand is preferable, as it is important to have the materials all mixed dry before mixing with water. Crystallization, or setting, begins at once with the addition of the water, and as little time as possible should be spent in thoroughly mixing and placing into the mold, or apparatus, after water has been added. There are many various concrete mixing machines, most of them being unnecessarily complicated; the best being a plain revolving cylinder working horizontally. Concrete mixed in machines is generally over-mixed after the addition of water.

The only liability to defects in cementing on concrete walls or floors, is where two coats are used, and when idle and ignorant workmen, to save themselves trouble, use too large a proportion of cement for the thin finishing coat; then in consequence of the variation in the contraction of the two coats, the outer one is liable to show fine surface or (as they are often called) sun cracks, and even in some cases to peel off. Of course this liability being known, can easily be provided against.

FORGING AND TEMPERING IRON AND STEEL.—The forging and tempering of iron or steel, says *Iron*, can be greatly enhanced, according to Herr Edward Blass, of Cleve, Prussia, by dipping the metal, in whatever form, in fused salt. This dipping in salt is also well adapted for annealing steel without the oxidation of the surface. If the metal be rusted, it must be allowed to remain some time in the bath. Borax can with good effect be mixed with the salt. Metal "purified" by such an immersion is very susceptible to galvanic depositions, and can easily be coated with copper, zinc, tin, nickel, silver, etc. For iron, in the spongy or powdered state, as obtained from the reduction of the ores, the salt bath is especially adapted, for it augments the combination of the particles by making their surfaces free from impurities. To prepare the bath for an application as here proposed, the salt must be fused in a puddling furnace, and the iron sponge, with the addition of a flux, be added in small quantities so as not to vitrify the salt. The iron is left in the furnace till the flux has combined with all the impurities and formed a slag, whereupon the iron is taken out and forged together. While the iron is in the furnace, it should be constantly covered with the salt, so that oxidation be prevented. For the hardening of iron, the salt is fused in a convenient vessel and the object immersed and from time to time a small quantity of ferrocyanide of potassa added, one or two pounds per 100 pounds of iron. The articles, according to their thickness, are permitted to remain from five to 30 minutes in this bath and are then plunged in water containing, in 100 parts, one part of hydrochloric acid, five of wine vinegar and one of salt. If the objects are to have a silver luster, they should be immersed for a few minutes in a mixture of three parts wine vinegar and one of hydrochloric acid.

PRIZE FOR STEAM WAGON.—Pennsylvania now promises to take her place in the list of States which offer a reward to the inventor of a successful steam road wagon. We read in the *American Manufacturer* that it is proposed, in a bill presented to the Pennsylvania Legislature, and now in the hands of the proper committee, to pay a premium or reward of \$10,000 to any citizen of the State who shall, within 10 years, construct upon plans of his own, and place in practical operation on the common roads, an engine or locomotive, propelled by steam power. The test required is that the engine shall propel itself a distance of 200 miles in a continuous direction, at an average speed of four miles an hour, and draw at least one vehicle carrying a weight of one ton. The construction of the apparatus is required to be such that it will conform to the track of the common wagon, turn out readily to pass other vehicles, ascend or descend grades of at least 300 feet to the mile, and apply power to at least one set of wheels on each carriage of the train designed to be drawn.

STEEL INSTEAD OF BRONZE.—The officers of the royal gun factories, says *Iron*, have been informed that the French government has resolved to discard its present system of bronze field-guns and make its guns of steel rings, puddled and cast. It has been under the consideration of the French artilleryists to adopt the English system of built-up, wrought-iron coils, including the muzzle-loading principle; but this would have required a new and extensive plant of machinery, whereas the transition from bronze to steel can be effected with very little trouble and expense, the substitution of a different metal being almost the only change. The preference of the French for breech-loading cannon is to be gratified by the application to these guns of the "screw relieve," or French system, and two kinds of field-pieces are to be produced—one rather larger than the English 16-pounder and the other somewhat smaller than the English nine-pounder, corresponding in size more nearly to the German than the English artillery.

CAST-IRON GLAZED TILES.—The *Deutsche Allgem. Zeitg.* says: At the iron works of Groeditz, near Riesa, Germany, glazed cast-iron tiles for roofing are now made. They are not heavier than ordinary tiles and are very strong. The railroad depots of Loebau and of Reichenbach, and of many private houses of Hamburg and Dresden are roofed with them.

SCIENTIFIC PROGRESS.

New Genus of Lumbriculidæ.

At the last meeting of the San Francisco Microscopical Society, Dr. Gustav Eison called attention to a new worm, about 20 inches long, which he had discovered in an irrigation ditch in Fresno county. His remarks were illustrated by exquisite drawings. The worm was a member of a new genus of *Lumbriculidæ*, which family had hitherto not been known to exist outside of Europe. Of this family, only five genera were previously known, viz.: *Stylocyrtus*, *Lumbriculus*, *Rhynchelmis*, *Phreatothrix*, *Trichodrilus*. The new genus added to the list was *Acerodrilus*.

Lumbriculidæ differs from all other families of *Oligochaeta*, in having four efferent ducts in the segment. *Stebificidæ* and other families had only two ducts in the same segment. From the genera in the same family, *Acerodrilus* is most remarkably distinct, clearly all its organs showing characteristics which even would place the genus in a new family. As very little is known of the anatomy of the *Oligochaeta* or earth-worms, every contribution is valuable and interesting.

In all other genera of *Lumbriculidæ* the ventral vessel is divided in some of the anterior segments; in *acerodrilus* the same vessel is entire. In all other genera of *Lumbriculidæ* the dorsal vessel is entire. In *Acerodrilus*, on the contrary, said vessel is divided in three branches, all three connecting in every segment with each other and with the ventral vessel. The alimentary canal is in the *oesophagus*, furnished with two large sack-like appendices, not met with elsewhere in this order. In the eighth and ninth segments, we find two pair of large pulsating hearts. In the other genera no hearts are met with.

Two pair of minute testes are found attached the disjunctments in the eighth and tenth segments. In other genera the testes are seldom found in pair and always very large, often filling a large part of the body. The ovaries are situated in the eleventh setigerous segment, and the oviducts, which, contrary to what is generally the case, are very large in the thirteenth setigerous segment. The efferent ducts are from the upper quarter, grown together, and at their lower end not furnished with any prostrate glands; neither do they enter a common atrium, which is elsewhere always the case. But the most remarkable characteristic of *Acerodrilus* is that the efferent ducts and the receptacle opens into the same external pore into the sixteenth segment, a fact not elsewhere met with. The receptacle, which is extraordinarily long, extends from the sixteenth to the twenty-fifth segment and sometimes further back.

Besides *Acerodrilus*, the Doctor has also found a species of each of the genera *Lumbriculus* and *Rhynchelmis*, the former in marshes in Sierra Nevada, the latter in the old mountain lake, near the Marine hospital, San Francisco. Besides, the Doctor thought that many new and interesting worms could be discovered in the many lakes and ponds of California, and called the attention of the members of the Society to the value and interest of even the smallest contributions, which he would most thankfully receive.

CONVERSION OF MOTION INTO HEAT.—M. Oliver gives, in the *Journal des Debats*, the following accounts of his interesting experiment in the illustration of the conversion of motion into heat: One end of a square bar of steel is held by one hand in the middle, and pressed strongly against a rapidly revolving emery wheel, by which means the extremity so applied becomes considerably heated. The band at the middle of the bar does not feel any change of temperature, but that at the other extremity is soon obliged to let go, the temperature rising to the point of burning the skin. This effect, which appears paradoxical at the first glance, is thus explained by M. Oliver: The heat that burns the hand is not generated at the other extremity of the bar and transmitted thence, but is produced directly at the place; movement and heat being synonymous; the movement destroyed by the hand at the outward extremity of the bar by the stoppage of the vibration is converted into heat, while, there being an interval of repose at the middle of the bar, no heat is perceived at the time. A curious feature of the experiment is that at the outer extremity the thermometer does not show any exceptional temperature, because the thermometer does not stop the vibration. To produce the heating effect, the hand should grasp the end of the bar with force enough to arrest the movement.

CLIMATIC CHANGES.—It would seem that not only is the climate of Iceland growing so cold that grain cannot ripen there, but that of Scandinavia and western Europe is becoming more severe. This is due, it is supposed, to the steady descent of the ice of the far north upon the shores of Iceland. It has been ascertained that the temperature of Greenland was once much more mild than at present. Plants have been discovered in a fossil state there which cannot now show a sign of life. In the Atlantic, also, ice has been found much further south than formerly. Is another ice age slowly making its approach?

The Liquefaction of Oxygen.

One of the most interesting of late advances in chemistry is the forcing of oxygen to take a liquid form. This has been done before with several other gases, and now we have but hydrogen, nitrogen and some of their compounds left in gaseous form. The achievement with oxygen was accomplished by a Frenchman, Raval Pictet, at Geneva, Switzerland, on December 22d, and at once telegraphed to Prof. Tyndall. The liquefaction of oxygen was accomplished in this way: By a double circulation of sulphurous acid and carbonic acid the latter gas, as is well known, is liquefied at a temperature of 63° of cold under a pressure of from four to six atmospheres. The details of the experiment are then as follows: The liquefied carbonic acid is led into a tube four meters in length; two compound-action pumps make a barometric vacuum in this acid, which solidifies, owing to the difference of pressure. In the interior of this first tube, containing the solidified carbonic acid, passes a smaller tube, in which there circulates a stream of oxygen. The oxygen is yielded by chlorate of potash in a strongly made cylindrical generator with egg-shaped ends. The generator will resist a pressure of 800 atmospheres. On the morning of the 22d the apparatus as described was put in proper trim, and when the pressure reached 300 atmospheres a jet of liquid oxygen spirted from the end of the tube at the moment when the compressed and frozen gas passed from this high pressure to that of the atmosphere. The great interest of the experiment lies in the experimental demonstration supplied by it of the mechanical theory of heat, aiding as it does in the proof that all the gases are vapors capable of successive transmutation from the gaseous to the liquid, and from the liquid to the solid form.

The degree of cold is not mentioned in the above hurried report. From Prof. Tyndall's telegram it appears to have been 100° C.; the pressure in the telegram is given 320 atmospheres, not 300.

It is also claimed in Geneva that about a fortnight ago M. Cailliet succeeded in liquefying the binoxide of nitrogen, under a pressure of 146 atmospheres, at a temperature of 11° of cold, but the experiment is not fully authenticated.

SPONTANEOUS GENERATION.—An interesting series of experiments has been conducted in London, says the *Polytechnic Review*, to decide the question of spontaneous generation; that is to say whether vegetable or animal life can start into existence itself or whether all life is but the perpetuation of life already existing. Prof. Tyndall declares the question "practically set at rest for the scientific world" in the negative. His last experiment was on the Alps, he took with him from London, packed in sawdust, 60 flasks containing infusions of animal and vegetable matter, boiled to destroy all living organisms and sealed while the fluid was still in ebullition. The necks of six of the flasks were broken by accident, and were found filled with organisms. The other 50 remained for six weeks perfectly clear and pellucid. Twenty-three of the flasks were then opened in a hay loft. The other 27 were opened at a high elevation, and on the edge of a precipice, where the air was absolutely pure and free from "spores." The two groups were then placed in a warm kitchen. The 27 flasks opened out of doors remained pure, and without any indication of microscopic life. Of the 23 opened in the hay loft 21 were instinct with life, and filled with darting, dancing minute forms. Two of the 23 remained clear.

A PHYLOXERA EATER.—The *London Farmer* says that at a recent sitting of the Paris Academy of Sciences a letter was read from M. Laliman, in which he describes a larva or grub which had been seen to devour 94 phylloxeras in the course of 10 minutes. He proposes for it the name of "Phylloxera cannibale." M. Balbini says that the larva belongs to the genus *Syrphus*, or some closely allied one, but declines to classify it more closely until he has seen the perfect insect. The larva destroys the phylloxera by seizing upon it and sucking out its fluid contents, and this maneuver it repeats until satisfied. Repletion is not readily reached it appears, for it thinks nothing of 12 dozen victims for a mere early breakfast.

ANT IN AMBER.—At the late meeting of the Microscopical Society, Mr. Woodward exhibited a fine specimen of mounting, performed in nature's laboratory, in the way of an ant in a piece of amber. This relic of cretaceous life had the good fortune to drop himself into the fluid resin as it escaped from the amber-fir, one of the conifers of that age; and thus embalmed, was preserved in the same manner objects are now mounted in Canada balsam, and when placed under a two-inch objective, was found to be perfect in detail as well as general form. It was fixed in a slide by Mr. Kinne, and placed in the cabinet for future examination.

NORTHERN EXPLORATION.—The Dutch are fitting up a vessel to engage in the exploration of the waters of Spitzbergen and Barentz next summer. Recent discoveries in these waters make it probable that this expedition will have a commercial value.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

The Eclipse Mining Company.

EDITORS PRESS:—Will you do me the favor of publishing the following in answer to a statement made at the last meeting of the Eclipse gold mining company, as reported in the London Mining Journal of December 22d, 1877. The statement is mischievous, and if uncontradicted is very likely to prove injurious:

The Eclipse mine, as of course you know, is in Inyo county, California, and is a most valuable property. Mismanagement and carelessness on the part of the home directors have resulted in the collapse, for which I, being several thousand miles away, am made the scapegoat. Two facts in reply to the imputations of incompetency and dilatoriness.

From April to August of last year I kept the mine constantly running under the burden of law suits, attachments, labor troubles and want of funds. Statement after statement of how matters stood was forwarded to the home office, to none of which I received a reply. Everything went on from bad to worse until, despairing of relief, and literally unable to obtain credit, I saw the Sheriff in possession and was compelled to leave for San Francisco. Even here I have heard nothing from headquarters, and it was only from the chance remark of a third party that I learned of the reported liquidation. In the second place, I have simply to say that statements were forwarded to Finsbury Circus regularly as possible under the existing circumstances at the time, and have since then kept them informed of vital matters relating to the mine, etc.

The foregoing is in answer more particularly to that portion of the Secretary's report, as copied in the journal referred to above, of which I extract the following:

"Mr. Nelson who had been sent out had proved of no service whatever, and he (the Secretary) had never been able to obtain any information from him relative to the accounts."

In conclusion I would add that if English capital invested as this had been, if properly managed by the officials at headquarters, shareholders would have obtained ample returns for their money invested and the blame of non-success is attributable to them (Directors) and not to their representatives on this side of the Atlantic. Although still these representatives here can but say that every assistance has been offered for their welfare, but they have not thought it worth while to avail themselves or appreciate the same.

C. S. NELSON.

Eclipse G. M. & Q. Co., Inyo Co.

The Report of the Meeting.

A special general meeting of shareholders was held at the offices of the company, Finsbury Circus, London, on Wednesday, Mr. Potts in the chair, to consider the present position of the company and the desirability of a voluntary winding up. The Chairman said the Directors had called the present meeting in order to lay before the shareholders such information as Mr. Rickard had sent over, relative to the position of the property. The Directors had delayed calling the present meeting in the hope that Mr. Rickard would have returned from America, and been present, in order to state the fullest particulars regarding the property. Unfortunately, Mr. Rickard had not returned, having been engaged in some mining speculation in America. After the letters of Mr. Rickard had been read, perhaps some of the shareholders might think there was a ray of hope with regard to prosecuting the mine, but they had spent money without any return, that possibly they might not think it worth while to go in any further. He might mention that himself and Mr. Wild did not intend to advance any more money and Mr. Hulbert had also lost heart. That being so, there was only one course, to wind up voluntarily and appoint liquidators. As regards the accounts, the Secretary would be able to render an account with regard to England, but it has been utterly impossible to get any reliable accounts whatever from the other side.

The Secretary then read extracts from the most recent letters from the mine, showing the present unfortunate position of the property and the utter impossibility of continuing operations unless further money was forthcoming. The Secretary also mentioned that a debenture holder in this country had already lodged a petition for the compulsory winding up of the company. The Secretary, in answer to questions, said it would take about £5,000 to pay off the present indebtedness, but it would leave no capital to go on with and they would require another £5,000 to develop the property. Some time since a telegram was sent over from here, saying that funds were required to release the property; and in answer to a question as to how much it would take, the reply was \$4,000. A sum of £800 was subscribed and sent over to enable the property to be released, but it was afterwards found that considerably more than that amount was required, as the £800 only went a small way towards paying the workmen and such like things. Mr. Nelson, who had been sent out, had proved of no service whatever, and he (the Secretary) had never been able to obtain any information from him relative to the accounts. A shareholder said, it was

clear that unless a certain sum of money could be raised, it was utterly impossible to continue operations at the mine. The property was mortgaged to secure the debentures, which were a first charge upon it. It is impossible to raise money in operations. The proper course to pursue would be to direct the Board to place the company in a proper condition for liquidation. A lengthened conversation ensued, in the course of which several legal points were raised, which were replied to by the solicitor. Eventually it was decided to liquidate the company voluntarily, and Mr. I. H. Taylor and Mr. Bluet were appointed liquidators.

Poisoned Arrows.

EDITORS PRESS:—Entomological investigation is now receiving special attention at the national capital, and at the last two or three meetings of the Philosophical Society here, papers have been read on the subject of poisoned arrows. At the meeting of the Society held on the 22d of December, Maj. Powell advanced the belief that poisoned arrows were not and had not been in use by any of the American aboriginal tribes. At the last meeting of the Society, Dr. Elliott Cones, Secretary of Prof. Hayden's Geological Survey, made some remarks on the subject, based on his own observations as a surgeon in the army, having, on frequent occasions, while stationed at military posts in the Indian country, dressed wounds inflicted by poisoned arrows used by Indians, on soldiers and others. Dr. Cones was also fortified by many facts, placed in the form of notes by Dr. Hoffman, of the Hayden Survey, based on his own experience, coupled with many illustrations obtained from other reliable sources.

During the time of Dr. Hoffman's residence at the military station at Grand river, D. T., in 1872-3, as Post Surgeon, he devoted most of his spare time to the study of the language of the Dakotahs, in addition to observations upon their customs, ceremonies and the mode of manufacturing weapons, implements and utensils. The whole number of names upon the rolls at the Agency here amounted to 13,500; 8,500 of this number avoided the settlement and were known as "hostiles." The remaining 5,000 lived in various localities, at from five to 40 miles from the agency. As most of these encampments were permanent, frequent excursions were made to some of them.

As the custom of poisoning arrows is not in general use in this day of firearms, a description of the mode of preparing the poison and its subsequent application to the arrow points will be of some interest.

The arrow-maker and the owner of the weapons go to one of the numerous prairie-dog towns, in and about which rattlesnakes (*Candisona confueta*), say, are to be found. One of the Indians is armed with several sticks, each from three to four feet in length, some of which are forked at one end; likewise the liver of an antelope or deer, usually the former, as they are more easily procured. When a rattlesnake is found, its escape is prevented by being gently but securely held to the ground by means of one of the forked sticks, which is placed about the middle of the body. The other Indian now impales the liver upon a slightly pointed stick, and by thrusting it at and teasing the snake, the latter becomes enraged and buries its fangs repeatedly in the liver. When the reptile has exhausted itself or refuses to bite any longer, it is killed. The liver is then carried back to camp and there placed upon a pole for exposure to the rays of the sun to hasten decomposition. This usually takes place in the course of a day, the actual length of time depending upon the state of the atmosphere. After the liver has become putrid, it is carefully taken down, put into a small vessel, where it is crushed and beaten into a plastic mass. The points of the arrows are then dipped into the viscid scum which accumulates upon the surface, after which they are allowed to dry. Finally they are placed, point downward, into one of the compartments of the quiver, reserved for poisoned arrows, and secured about the top with an extra thong, so as to prevent mistakes in their use. The other portion of the quiver contains the ordinary arrows employed in the chase.

A bow and quiver of arrows always forms a part of a warrior's outfit, and these are frequently brought into requisition on account of the noiseless manner in which they can be used. Whether the fatal effects of poisoned arrows are due to the presence of the venom, is a subject that requires investigation. The opinion of Dr. Hoffman is that the venom plays a very important part. The fact that the Indians have vegetable antidotes, and understand their application and effects, illustrates that they learned the fatality of the bite of the *Candisona*, and their ultimate employment of the venom as a toxic agent upon their arrows.

The Coyotero Apaches in the vicinity of Camp Apache, Arizona, are also known to occasionally use poisoned arrows. The Indians at this place exhibited many arrows which they said were poisoned, and it was perceived that the base of the arrow head in each case was covered with a dark brown, gummy substance, which was absent in the ordinary types. Dr. Milan Soule, who was for several years Post Surgeon at the above named locality, states that this sub-tribe of Apaches sometimes use poisoned arrows.

Dr. Elliott Cones, of the U. S. Army, furnishes, among others, ("Medical and Surgical Reporter," Vol. XIV, pp. No. 17, 321-324), an in-

teresting case of an arrow wound, which, on account of its peculiar progress and fatal termination, was, very justly, considered by him to have been a poisoned one. This case also was observed in Arizona.

Mr. James Stevenson, of Prof. Hayden's Survey, states that the Crows, Blackfeet, Assiniboines and Northern Dakotahs poison their arrows. The latter named tribe has already been alluded to. The other three prepare their poisoned arrows in the following manner, viz.: A rattlesnake is secured, and so tantalized or provoked that it will bite a piece of smooth wood or bark held by one of the Indians, after which the arrow points are rubbed upon the venom, and allowed to dry. The venom, just after it has been deposited upon the bark, is semi-transparent, and of a glutinous consistency. Frequently the heads of rattlesnakes are kept on hand for future use, when the poison sac can be extracted, and the venom utilized as required.

Prof. F. V. Hayden substantiates the above statement, and in addition says that these operations could be seen whenever there was any considerable gathering of Indians, such as when making the necessary preparations for a grand hunt, or a hostile expedition.

The very reason that some of the quivers are divided into two partitions, one of them as the receptacle for so-called poisoned arrows, is sufficient to show that these Indians apply some substance intended to insure the death of the subject upon which it may be used.

Some of the "Diggers" living in the upper portion of California are known to use the juice of the wild parsnip, mixed with the putrid liver of a dog. Mr. W. H. Dall, of the U. S. Coast Survey, has observed that the natives living in northeastern Siberia poison their weapons by dipping them into the putrid liver of the white bear. The liver is said by Mr. Dall, to be poisonous even when fresh. The natives use their poisoned arrows in the destruction of herds of prey, and other animals whose flesh is unfit for food, such as wolves, foxes, etc.

The use of the wooraly poison by some of the South American Indians is a well known fact. Schombergk says: "The wooraly or ourary poison is prepared by the Makosic Indians from the pirairia and by the Warpesbaues of the Eonocon mountains on the Orinoco from a new strychnos, toxifera." N. H. Schombergk; strychnos toxifera; foliis ovato lanceolatis, acuminatis, 3-5 nervis utrinque ramulicis ferrugineo tomentosis, hacca polysperma (Oken's Isis, Bd. XXXI, 1838, p. 100.) ["The Lond. and Edin. Philosophical Mag. and Jr. of Science," vol. x, 1837, p. 72.]

It was at one time supposed that the origin of venereal diseases was due to the poison employed in the destruction of fish and game. In this connection Dr. Rees (The Cyclopaedia, or Universal Dictionary of Arts, Sciences and Literature, by Abraham Rees, etc., Phila., vol. I., under the title of "America," says: "It has been pretended, that the flesh of fish intoxicated with the curruu, ape and the flesh of the game killed with arrows poisoned with a species of woodbine called wooraly, produced this contagion among them." This quotation has reference to the West India Islands, the Caribbees, Florida, Mexico and Peru. Mr. Rees further states that "In the Island of San Domingo, where the venereal disease was extremely rife, the use of poisoned darts was not in practice as among the Caribs and several families on Terra Firma."

Sufficient evidence has been obtained to illustrate the fact that poisoning arrows is still practiced by tribes within the limits of the United States, without having to hunt elsewhere to show that such customs exist or ever did exist.

Washington, D. C., Jan. 21.

Mines or "Prospects."

Why does the *Citizen* persist in calling Conelly's mine the Guanajuato, when the owners call it the Whana Whata, the Whana Uhata, and other names? It has been incorporated as the Wana Juata—they knew there was a "j" in it somewhere. There has been such a clashing of cymbals and tooting of horns over this location that there is danger of California thinking that Arizona considers this phonetically named mine the biggest thing we've got. Some of us fellows, who have never seen it, are beginning to think its owners are developing their honanza with gas rather than with blasting powder. We have no doubt it is a pretty good property, but there has yet occurred nothing that gives it rank, even among our third rate mines. There has been no reason in the landatory spasms of the Los Angeles papers—unless they got some of the stock. Solid silver from it was shipped to San Francisco in sacks and boxes—and proved to be chiefly manganese and magnesium. Assays were promised of thousands of dollars per ton—results gave only hundreds. Of two lots, one assayed 138 ounces and the other about 200. Such things hurt the country. When a man tries to interest capital in a really meritorious property, he is forced to prove that it is not another phonetic Guanajuato. This premature puffing of mere croppings has always injured mining districts. The proper time for blowing and flourish of trumpets arrives when a mine has been passably opened, is turning out bullion and has something in sight. Then it is safe to let the eagle scream a little. Puffing croppings is like blowing up a bladder; too much inflation bursts the outfit. We have good mines enough to hoast of, without wasting ourselves on good places for dumps.—*Arizona Sentinel*.

Eastern Oregon Mining Prospects.

A correspondent of the *Idaho Avalanche* says: If past endeavor may be considered an earnest of future attempt, eastern Oregon has much to expect during the coming year, from the labors of the prospecting miners scattered throughout her territory. Evidence of the efforts made by these fortune hunters to unearth the treasures concealed in our mountains, streams and gulches abound on every hand. Indeed, the long ditches, deep shafts, wide cuts and giant piles of quartz and gravel speak more eloquently on their behalf than anything I could hope to write. If faith, hope, energy and industry were of themselves sufficient to the complete development of our mineral resources, a prosperous future for this section of the country would be insured. Apart from what has been done during the past year in the way of placing our quartz mines on a paying basis, through the agency of these attributes alone, much that is worthy of notice has also been accomplished in the way of opening the placer claims of Baker and Union counties. As far as the yield of gold from quartz is concerned every miner knows that it must depend in a great measure on the caprice of capital, if that essential can be called caprice. But with surface diggings it is different. Fortunately for their development, capital is not in all cases required, and much can be accomplished by individual effort where corporate action would be essential to the successful working of quartz. Given a fair prospect, a decent "grub stake" and any possibility of getting water on to the claim, the average miner will, in nine cases out of ten, have a ditch on to the premises if nerve and muscle will do it.

Despite the scarcity of water, there has been much activity displayed in all our placer fields during the season of '77. From Pocatontas, Auburn, Clark's creek, El Dorado, Malheur, Mormon Basin and Rye valley returns are reported commensurate with those of more favorable seasons. Here on Snake river and in the vicinity of Burnt river some 20 claims have been opened, paying all the way from \$2 to half an ounce per day to man. Foremost among the enterprises of this kind that have occupied the attention of the public must be placed the successful termination of Mr. Thomas Huffman's project to bring Douglas Bar near the mouth of Connor creek, under the potent influence of a hydraulic head. This Bar is said to be one of the richest spots on Snake river. Judging from external appearances it may be appropriately termed a foothill of the Snake river mountains, lying as it does at the very foot of the range, with no apparent line of demarcation between the wash gravel of which it is constituted and the talcose state of the ridge it borders. Taking as a point of departure the left bank of Connor creek it extends in a northerly direction a mile from that stream, and has an average width of 150 yards. The subsidence of Snake river from this, its old channel, to its present bed, has left the surface of the bar at an elevation of 200 feet above the level of that stream. The mean depth of the gravel is 15 feet. Before attempting to bring water on to the ground Mr. H. prospected it carefully at different points and was encouraged to proceed from the flattering nature of the prospects discovered. Satisfied of its richness, nothing remained to be done but to introduce the water to make it a source of revenue. The way was not clear, however. There were obstacles to be met and overcome. With the resolution of an old-timer Mr. H. set to work, confident that the attainment of his end would fully compensate him for the outlay of time and trouble. He was met at the outset with more claimants to the water, as he expressed it, than you could shake a stick at. By one means and another, however, he succeeded in acquiring the title and started to excavate his ditch in August last. Much of its course lies through hard rock, and blasting had to be resorted to. A half mile of the distance had to be flumed, and 17,000 feet of lumber were used for that purpose alone. Nearly \$3,000 were paid for labor and the result of this expenditure of time, and thought, and labor and money is a conduit three miles long with a capacity for 300 inches of water, which will have a fall of 125 on to the ground, that has yielded as high as \$2.50 to the pan. Mr. Huffman has just received an offer of \$8,000 for the property.

Messrs. Grayson, Woods & Thompson own a claim embracing 1,000 feet of this bar and with commendable industry and prudence are energetically pushing a drift across their property to test the value of the same.

On Connor creek, near the site of the old Sleeper mill, Frazer, Way & Bohena are attempting to reach bedrock. An incredible amount of work has been done at this claim and, from present indications more remains to be done before bedrock is reached. Good prospects have been found from the surface down for a depth of 30 feet. Recently a derrick has been erected which will facilitate the handling of the boulders encountered. The Connor Creek mill and mining company are running 15 stamps, crushing 27 tons of ore per day of 24 hours and are reported to be cleaning up at the rate of \$7,000 per month. Only eight miners are employed.

A MAN who recently went to the Black hills, wrote back to his friends as follows: "Offer a premium at your next fair for the biggest fool in the country and I will try and get there in time."

MECHANICAL PROGRESS.

Hints for Iron Melters.

The man who prepares and charges the cupola in a foundry holds the key to the production of good castings, no matter how successfully the molder may do his work. It is important, then, that all melters should study their business and learn what are the points of success. In the course of an able series of articles on iron-founding, which Edward Kirk is writing for the *Iron Age*, we find the following hints on the work of the melter: The practical and scientific melter is the melter who understands his business and attends to his business; he chips out his cupola, and daubs it up in proper shape; he puts up the iron bottom and sees that it fits close and solid and is properly supported; he puts in the sand-bottom, and sees that it is packed solid and even, and has the proper pitch, without any hills or hollows in it; he puts in the front so that it never blows out, and he sees that the spout is in proper shape; he always has the tapping bars drawn down to a sharp point, so that he can tap with ease, and have the tap-hole large or small; he has his bod clay thoroughly mixed, and his bod-sticks always handy and in good shape. When he wants to stop-up he takes the bod-stick and sees that there is a bod on it in proper shape; he then puts the hod right over the tap-hole and gives it a sudden downward pressure, and stops the iron with ease. He puts in the shavings to light the fire with, and sees that they are properly spread over the sand-bottom, so as to light the wood evenly—the wood is cut short and split, and every piece is laid in the cupola in proper shape, so as to give the fire the best possible chance to burn and light the coke or coal evenly; he selects a few small pieces of coal or coke that will light easily, and puts them in on the wood; he then puts in the bod. If the cupola has a good draft he puts in all of the bed before the fire is lit, if the cupola has a poor draft, he only puts in part of the bed before the fire is lit, and the balance after the fire has got thoroughly started. He sees that the bed is evenly burnt and level on top before the iron is charged; he charges the iron compactly together, so that it will get the good of all the heat from the fuel; he sees that every charge of iron is level and even on top when all in; he sees that every charge of fuel is properly distributed over the iron, so that it will melt the next charge of iron properly, and at an even temperature; he increases or diminishes the amount of coal or coke in the bed, or between the charges of iron, at the rate of 25 or 50 pounds at a time, until he finds the exact amount required; he increases or diminishes the amount of iron on the bed, or in the charges, at the rate of 100 pounds at a time, until he finds the exact amount of iron that can be melted in that particular cupola with the smallest percentage of fuel; he then continues that charging without any variation; if he gets in a poor lot of fuel, he may increase the bed and charges of fuel a few pounds; or, if the fuel is extra good, he may decrease a few pounds, but always with caution and safety; he watches the direction the wind blows, and notes the effect that a north, south, east or west wind has upon the draft of his cupola, and he lights his fire accordingly, so as to have the bed burnt as near alike every day as possible; he inspects the blast-pipe and tuyeres every day to see that there are no holes in the pipe through which the blast may escape, and to see that the tuyeres are in proper shape, so that the blast will not escape up behind and through the lining, in place of through the stock; he notices the exact effect of the blast upon the cupola, and he knows when he is not getting enough blast, and at once complains to the foreman or engineer; he looks around the shop, toward the last of the heat, and sees or asks the foreman how much more iron is wanted; he then looks into the cupola, and if he thinks there is not enough iron in to pour off with, he throws in a little more, before the stock gets too low to melt it. The practical and scientific melter does everything according to rule, and not by guess, and the foundrymen can depend upon him having good, hot, clean iron every day, if it is possible to make it in his cupola.

Notes on Concrete.

Concrete in this State is widely used for foundations and for other building purposes. The following hints from *Savard's Journal* will be found valuable: Much harm is done, time wasted and annoyance caused by the habit of inexperienced persons picking and poking at cement samples of work, before it has had time to get strength. To such persons quick-setting, light-weight cements would appear to promise good results; but it is now well known by every one practically acquainted with the use of cement, that the well-burned, heavy, finely-ground, slow-setting concretes, are the best for concrete purposes.

The water for mixing concrete should be clean. It is possible to destroy much of the strength of cement by using dirty or polluted water. Sea water has not been found injurious, but it is supposed to delay the setting. Respecting the quantity of water to be used there is more danger to be apprehended from using less than from using more than the right quantity. The correct quantity of water is of course sufficient to convert the cement into a thin paste, that shall completely coat and

cause to adhere all the particles of the aggregate.

Concrete mixed by hand is preferable, as it is important to have the materials all mixed dry before mixing with water. Crystallization, or setting, begins at once with the addition of the water, and as little time as possible should be spent in thoroughly mixing and placing into the mold, or apparatus, after water has been added. There are many various concrete mixing machines, most of them being unnecessarily complicated; the best being a plain revolving cylinder working horizontally. Concrete mixed in machines is generally over-mixed after the addition of water.

The only liability to defects in cementing on concrete walls or floors, is where two coats are used, and when idle and ignorant workmen, to save themselves trouble, use too large a proportion of cement for the thin finishing coat; then in consequence of the variation in the contraction of the two coats, the outer one is liable to show fine surface or (as they are often called) sun cracks, and even in some cases to peel off. Of course this liability being known, can easily be provided against.

FORGING AND TEMPERING IRON AND STEEL.

The forging and tempering of iron or steel, says *Iron*, can be greatly enhanced, according to Herr Edward Blass, of Cleve, Prussia, by dipping the metal, in whatever form, in fused salt. This dipping in salt is also well adapted for annealing steel without the oxidation of the surface. If the metal be rusted, it must be allowed to remain some time in the bath. Borax can with good effect be mixed with the salt. Metal "purified" by such an immersion is very susceptible to galvanic depositions, and can easily be coated with copper, zinc, tin, nickel, silver, etc. For iron, in the spongy or powdered state, as obtained from the reduction of the ores, the salt bath is especially adapted, for it augments the combination of the particles by making their surfaces free from impurities. To prepare the bath for an application as here proposed, the salt must be fused in a puddling furnace, and the iron sponge, with the addition of a flux, be added in small quantities so as not to vitrify the salt. The iron is left in the furnace till the flux has combined with all the impurities and formed a slag, whereupon the iron is taken out and forged together. While the iron is in the furnace, it should be constantly covered with the salt, so that oxidation be prevented. For the hardening of iron, the salt is fused in a convenient vessel and the object immersed and from time to time a small quantity of ferrocyanide of potassium added, one or two pounds per 100 pounds of iron. The articles, according to their thickness, are permitted to remain from five to 30 minutes in this bath and are then plunged in water containing, in 100 parts, one part of hydrochloric acid, five of wine vinegar and one of salt. If the objects are to have a silver luster, they should be immersed for a few minutes in a mixture of three parts wine vinegar and one of hydrochloric acid.

PRIZE FOR STEAM WAGON.—Pennsylvania now promises to take her place in the list of States which offer a reward to the inventor of a successful steam road wagon. We read in the *American Manufacturer* that it is proposed, in a bill presented to the Pennsylvania Legislature, and now in the hands of the proper committee, to pay a premium or reward of \$10,000 to any citizen of the State who shall, within 10 years, construct upon plains of his own, and place in practical operation on the common roads, an engine or locomotive, propelled by steam power. The test required is that the engine shall propel itself a distance of 200 miles in a continuous direction, at an average speed of four miles an hour, and draw at least one vehicle carrying a weight of one ton. The construction of the apparatus is required to be such that it will conform to the track of the common wagon, turn out readily to pass other vehicles, ascend or descend grades of at least 300 feet to the mile, and apply power to at least one set of wheels on each carriage of the train designed to be drawn.

STEEL INSTEAD OF BRONZE.—The officers of the royal gun factories, says *Iron*, have been informed that the French government has resolved to discard its present system of bronze field-guns and make its guns of steel rings, puddled and cast. It has been under the consideration of the French artilleryists to adopt the English system of built-up, wrought-iron coils, including the muzzle-loading principle; but this would have required a new and extensive plant of machinery, whereas the transition from bronze to steel can be effected with very little trouble and expense, the substitution of a different metal being almost the only change. The preference of the French for breech-loading cannon is to be gratified by the application to these guns of the "screw relieve," or French system, and two kinds of field-pieces are to be produced—one rather larger than the English 16-pounder and the other somewhat smaller than the English nine-pounder, corresponding in size more nearly to the German than the English artillery.

CAST-IRON GLAZED TILES.—The *Deutsche Allgem. Zeitg.* says: At the iron works of Grodzitz, near Riesa, Germany, glazed cast-iron tiles for roofing are now made. They are not heavier than ordinary tiles and are very strong. The railroad depots of Loebau and of Reichenbach, and of many private houses of Hamburg and Dresden are roofed with them.

SCIENTIFIC PROGRESS.

New Genus of Lumbriculidæ.

At the last meeting of the San Francisco Microscopical Society, Dr. Gustav Eisen called attention to a new worm, about 20 inches long, which he had discovered in an irrigation ditch in Fresno county. His remarks were illustrated by exquisite drawings. The worm was a member of a new genus of *Lumbriculidæ*, which family had hitherto not been known to exist outside of Europe. Of this family, only five genera were previously known, viz.: *Styledrilus*, *Lumbriculus*, *Rhynchelmis*, *Phreatothrix*, *Trichodrilus*. The new genus added to the list was *Acerodrilus*.

Lumbriculidæ differs from all other families of *Oligochaeta*, in having four efferent ducts in the segment. *Stylophile* and other families had only two ducts in the same segment. From the genera in the same family, *Acerodrilus* is most remarkably distinct, nearly all its organs showing characteristics which even would place the genus in a new family. As very little is known of the anatomy of the *Oligochaeta* or earth-worms, every contribution is valuable and interesting.

In all other genera of *Lumbriculidæ* the ventral vessel is divided in some of the anterior segments; in *acerodrilus* the same vessel is entire. In all other genera of *Lumbriculidæ* the dorsal vessel is entire. In *Acerodrilus*, on the contrary, said vessel is divided in three branches, all three connecting in every segment with each other and with the ventral vessel. The alimentary canal is in the *oesophagus*, furnished with two large sack-like appendices, not met with elsewhere in this order. In the eighth and ninth segments, we find two pair of large pulsating hearts. In the other genera no hearts are met with.

Two pair of minute testes are found attached the dissepiments in the eighth and tenth segments. In other genera the testes are seldom found in pair and always very large, often filling a large part of the body. The ovaries are situated in the eleventh setigerous segment, and the oviducts, which, contrary to what is generally the case, are very large in the thirteenth setigerous segment. The efferent ducts are from the upper quarter, grown together, and at their lower end not furnished with any prostatic glands; neither do they enter a common atrium, which is elsewhere always the case. But the most remarkable characteristic of *Acerodrilus* is that the efferent ducts and the receptacle opens into the same external pores into the sixteenth segment, a fact not elsewhere met with. The receptacle, which is extraordinarily long, extends from the sixteenth to the twenty-fifth segment and sometimes further back.

Besides *Acerodrilus*, the Doctor has also found a species of each of the genera *Lumbriculus* and *Rhynchelmis*, the former in marshes in Sierra Nevada, the latter in the old mountain lake, near the Marine hospital, San Francisco. Besides, the Doctor thought that many new and interesting worms could be discovered in the many lakes and ponds of California, and called the attention of the members of the Society to the value and interest of even the smallest contributions, which he would most thankfully receive.

CONVERSION OF MOTION INTO HEAT.—M. Oliver gives, in the *Journal des Debats*, the following accounts of his interesting experiment in the illustration of the conversion of motion into heat: One end of a square bar of steel is held by one hand in the middle, and pressed strongly against a rapidly revolving emery wheel, by which means the extremity so applied becomes considerably heated. The hand at the middle of the bar does not feel any change of temperature, but that at the other extremity is soon obliged to let go, the temperature rising to the point of burning the skin. This effect, which appears paradoxical at the first glance, is thus explained by M. Oliver: The heat that burns the hand is not generated at the other extremity of the bar and transmitted thence, but is produced directly at the place; movement and heat being synonymous; the movement destroyed by the hand at the outward extremity of the bar by the stoppage of the vibration is converted into heat, while, there being an interval of repose at the middle of the bar, no heat is perceived at the time. A curious feature of the experiment is that at the outer extremity the thermometer does not show any exceptional temperature, because the thermometer does not stop the vibration. To produce the burning effect, the hand should grasp the end of the bar with force enough to arrest the movement.

CLIMATIC CHANGES.—It would seem that not only is the climate of Iceland growing so cold that grain cannot ripen there, but that of Scandinavia and western Europe is becoming more severe. This is due, it is supposed, to the steady descent of the ice of the far north upon the shores of Iceland. It has been ascertained that the temperature of Greenland was once much more mild than at present. Plants have been discovered in a fossil state there which cannot now show a sign of life. In the Atlantic, also, ice has been found much further south than formerly. Is another ice age slowly making its approach?

The Liquefaction of Oxygen.

One of the most interesting of late advances in chemistry is the forcing of oxygen to take a liquid form. This has been done before with several other gases, and now we have but hydrogen, nitrogen and some of their compounds left in gaseous form. The achievement with oxygen was accomplished by a Frenchman, Raval Pictet, at Geneva, Switzerland, on December 22d, and at once telegraphed to Prof. Tyndall. The liquefaction of oxygen was accomplished in this way: By a double circulation of sulphurous acid and carbonic acid the latter gas, as is well known, is liquefied at a temperature of 63° of cold under a pressure of from four to six atmospheres. The details of the experiment are then as follows: The liquefied carbonic acid is led into a tube four meters in length; two compound-action pumps make a barometric vacuum in this acid, which solidifies, owing to the difference of pressure. In the interior of this first tube, containing the solidified carbonic acid, passes a smaller tube, in which there circulates a stream of oxygen. The oxygen is yielded by chlorate of potash in a strongly made cylindrical generator with egg-shaped ends. The generator will resist a pressure of 800 atmospheres. On the morning of the 22d the apparatus as described was put in proper trim, and when the pressure reached 300 atmospheres a jet of liquid oxygen spirted from the end of the tube at the moment when the compressed and frozen gas passed from this high pressure to that of the atmosphere. The great interest of the experiment lies in the experimental demonstration supplied by it of the mechanical theory of heat, aiding as it does in the proof that all the gases are vapors capable of successive transmutation from the gaseous to the liquid, and from the liquid to the solid form.

The degree of cold is not mentioned in the above hurried report. From Prof. Tyndall's telegram it appears to have been 100° C.; the pressure in the telegram is given 320 atmospheres, not 300.

It is also claimed in Geneva that about a fortnight ago M. Cailliet succeeded in liquefying the binoxide of nitrogen, under a pressure of 146 atmospheres, at a temperature of 11° of cold, but the experiment is not fully authenticated.

SPONTANEOUS GENERATION.—An interesting series of experiments has been conducted in London, says the *Polytechnic Review*, to decide the question of spontaneous generation; that is to say whether vegetable or animal life can start into existence itself or whether all life is but the perpetuation of life already existing. Prof. Tyndall declares the question "practically set at rest for the scientific world" in the negative. His last experiment was on the Alps, he took with him from London, packed in sawdust, 60 flasks containing infusions of animal and vegetable matter, boiled to destroy all living organisms and sealed while the fluid was still in ebullition. The necks of six of the flasks were broken by accident, and were found filled with organisms. The other 50 remained for six weeks perfectly clear and pellucid. Twenty-three of the flasks were then opened in a hay loft. The other 27 were opened at a high elevation, and on the edge of a precipice, where the air was absolutely pure and free from "spores." The two groups were then placed in a warm kitchen. The 27 flasks opened out of doors remained pure, and without any indication of microscopic life. Of the 23 opened in the hay loft 21 were instinct with life, and filled with darting, dancing minute forms. Two of the 23 remained clear.

A PHYLOXERA EATER.—The London *Farmer* says that at a recent sitting of the Paris Academy of Sciences a letter was read from M. Lalliman, in which he describes a larva or grub which had been seen to devour 94 phylloxera in the course of 10 minutes. He proposes for it the name of "Phylloxera cannibale." M. Balbini says that the larva belongs to the genus *Syrphus*, or some closely allied one, but declines to classify it more closely until he has seen the perfect insect. The larva destroys the phylloxera by seizing upon it and sucking out its fluid contents, and this maneuver it repeats until satisfied. Repetition is not readily reached it appears, for it thinks nothing of 12 dozen victims for a mere early breakfast.

ANT IN AMBER.—At the late meeting of the Microscopical Society, Mr. Woodward exhibited a fine specimen of mounting, performed in nature's laboratory, in the way of an ant in a piece of amber. This relic of cretaceous life had the good fortune to drop himself into the fluid resin as it escaped from the amber-fir, one of the conifers of that age; and thus embalmed, was preserved in the same manner objects are now mounted in Canada balsam, and when placed under a two-inch objective, was found to be perfect in detail as well as general form. It was fixed in a slide by Mr. Kinne, and placed in the cabinet for future examination.

NORTHERN EXPLORATION.—The Dutch are fitting up a vessel to engage in the exploration of the waters of Spitzbergen and Barentz next summer. Recent discoveries in these waters make it probable that this expedition will have a commercial value.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

ANOTHER BREAK IN THE BIG DITCH.—Amador *Dispatch*, Jan. 26: We learn that another very serious break occurred in the Amador canal, last Tuesday, near Bald Rock. About 100 feet of the embankment was carried away.

THE DUNNING MINE.—The new quartz mine belonging to Mr. W. S. Dunning, near the Monterichard, still continues to yield rock of remarkable richness. We were shown several pieces of rock taken out a few days ago which were thickly studded with large chunks of free gold, fully as rich as any heretofore taken out.

DOWNS' MINE.—Amador *Ledger*, Jan. 26: This quartz claim is situated about one mile above Volcano, and owned by R. C. Downs, of Sutter Creek. The ledge was explored many years ago to the depth of 90 feet, and some very rich rock taken out, the ore yielding somewhere near \$50 per ton. For some cause work was abandoned, notwithstanding the flattering results obtained. Work was resumed lately by Mr. Downs. The shaft is now 130 feet deep. At this depth a drift has been run some distance, and the ore body at the breast shows four feet in thickness. The rock looks remarkably rich, showing lots of free gold.

KENNEDY.—The first clean-up of this mine since the resumption of work was made last week. The mill had been running for only three weeks, with intervals of idleness during that time. The haulion sent to San Francisco is roughly estimated at \$2,000. This sum will give an average yield of about \$5 per ton. While this cannot be called a good yield, still it more than covers expenses, and that is something to boast of in the history of the Kennedy for the past few years. A yield of \$5 per ton will place the company on a prosperous basis, and ensure the continued working of the property.

HUNT'S GULCH.—There has been considerable prospecting for quartz in this locality, which is close to the Mokelumne river on the Amador side. W. A. Neville is still plodding along on the Spanish Gulch claim. He has two or three men employed in running a tunnel in the richest part of the ledge. The indications are that this is a pocket mine. Large quantities of gold have been taken out of spots; while the quartz in places is found to be barren. The Gwin mine, on the Calaveras side, is of this character, the gold being met with in patches. Analogy favors the conclusion that there are claims of equal wealth on this side of the river.

PHENIX DITCH.—There is now flowing through the Phenix ditch about 250 inches more water than is required to run the mill. The Davis and Bonanza mills are to be run by water from the Phenix ditch. The first named mill started up last week. The strike in north shaft of the Phenix is believed to be very valuable, as it solves the hitherto doubtful question of a continuous ore-body running through the mine. I am informed by the Superintendent, W. T. Jones, that the ore in sight is sufficient to run the 80 stamps for the next three years.

The large building over the shaft of the Summit mine, above Sutter Creek, was completely wrecked by the storm last week.

BUTTE.

THE MINING BOAT.—Oroville *Mercury*, Jan. 26: Last Sunday, parties were at work on the mining boat, trying to float it down the river to a place opposite the Lava Beds. The boat is 100 feet long and 40 feet wide, and had on deck two engines and a large sucking tube. The workmen could only let it go foot by foot, as the water ran at the rate of 20 miles per hour. While thus at work, the cable broke and the boat plunged headlong down stream, but went only a short distance when it hit a rock, knocking a hole two feet in length in the boat and sending the sucker overboard with a tremendous crash. One man had three of his toes cut off by the accident and others came near being injured.

CALAVERAS.

MINE SOLD.—Calaveras *Citizen*, Jan. 26: We are informed that the Tiger mine, situated near Rich gulch, in this county, and principally owned by C. H. Livingston, of Columbia, has been purchased by Ira L. Ramsdell, of San Francisco. The price paid Mr. Livingston for his interest was \$11,500. He says that Mr. Ramsdell is calculated to manage the property successfully and that the Tiger will undoubtedly prove a profitable investment.

MOSQUITO ITEMS.—Calaveras *Chronicle*, Jan. 26: Everything is progressing favorably at Mosquito. At the Blue Jay, Potter, Rodgers & Spaulding are taking out richer rock than ever from a five-foot lead. The rock fairly glistens with the precious metal. The new engine and hoisting works at the San Bruno are just completed, ready and capable of sinking 1,000 feet. Holmes' mine is progressing under favorable circumstances. At the Banuer they are pushing ahead in the south level. The lead is widening and getting richer. At the John the Butcher mine they have at last struck the lead, and a good looking one at that, gold being visible throughout the rock. The Greenhorn is being reopened under the superintendency of Dave Lampson, with Thomas Miner as foreman.

EL DORADO.

NEW AND VALUABLE DISCOVERY.—El Dorado *Republican*, Jan. 26: Andrew Eliott, one of the oldest and most extensive prospectors on the coast, both in this State and Nevada, brought to this city, on Monday last, specimens of rock that were exceedingly rich in gold, silver and copper. His claim is located about 25 miles from here, and he claims that by far it is the most promising mining claim that he has ever seen and that he believes it will be the means of working a complete revolution in the mining interest of this county. G. W. Swan has the specimens referred to and will take them to San Francisco, for exhibition and assay, next week.

G. W. KIMBLE, near Gold Hill, struck another rich pocket, a few days ago, on his claim. We have been unable to learn how much he realized from it, but are assured that he took fully \$50 from the first pan after putting the pick into it. He has made several rich strikes of the kind heretofore, and several others, within a radius of about as many miles, have taken out large amounts.

INYO.

SANTA RITA.—Coso *Mining News*, Jan. 26: Work is about to be resumed on the Santa Rita mine, Mr. Green, Acting Superintendent, having received orders to proceed at once.

FURNACE.—Mr. Joseph McEvoy, of the El Monte mine, having extracted some 300 tons of good ore, is endeavoring to lease the Santa Rita furnace to have same reduced.

NEW FINDS.—Several new finds of silver ledges have been reported to us this week, but we have not had time to examine the ledges, although they are situated but a mile or two from Darwin.

NEW COSO FURNACES.—We understand that the furnaces of the New Coso company will be running within the next two weeks.

BETTER TIMES.—Times in Darwin at present are very dull, but if the companies operating here spend but one-half the money that has been levied and collected lately, we may look for a lively business revival before many weeks. Over \$480,000 in assessments have been levied, and, we presume, collected within the past three months.

GOON ORE.—Humphrey & Co., who have been quietly prospecting their mine—the Eureka, situated about one mile from Darwin, just below the Defiance—for a long time, had assays made, last Thursday, of the ore taken from the bottom of the shaft, at a depth of 214 feet, and the ore went as high as \$1,614 per ton.

EMIGRANT.—The bullion shipped, to-day, by the Emigrant company, amounts to 150 pounds, valued at \$3,000. Total for the month, to this date, \$6,150. Mr. Taylor came in with the bullion, and says everything is going along very nicely, the ore bodies looking well.

CERRO GORDO.—*Courier-Californian*, Jan. 26: The Beaudry furnace, of the Union Con. company, is making a steady output of 125 bars per day of probably the richest base bullion now produced on the coast, mainly from high-grade silver ore coming from the San Felipe. The lead mines yield only sufficient ore to furnish the necessary flux and keep the one furnace in operation.

MENDOCINO.

GOLD MINING.—Mendocino *Democrat*, Jan. 26: The Mendocino gold mining company, of which T. L. Carothers, Esq., S. Wurtenberg and Mr. Quinliven are members, and the field of operation of which is at Calpella, washed up \$27 in gold, Tuesday, and, we are told, with plenty of water, will make a much better showing. Wurtenberg tells us quite a lot of gold was taken out of there a number of years ago, of which he has specimens now.

NEVADA.

AT WORK.—Nevada *Transcript*, Jan. 23: Most of the mining claims at You Bet are in full operation, and the prospects of taking out a large amount of gold are most excellent.

GOLD HILL MINE.—Grass Valley *Union*, Jan. 24: We cannot confirm the report of a rich strike in the Gold Hill mine, but can say that they have found good gold-bearing rock on the floor of the south drift on the 350-ft level, where heretofore nothing very encouraging had been found. The general appearance of the mine is favorable, and all indications point to good development.

ROCKY BAR MINE.—The first clean-up of ore from this mine, under the new organization, was made this week, and from 155 loads they received 619½ ounces of retorted gold, valued at \$10,531.50, or about \$68 per load. Besides this there were sulphurets, which, when worked, will increase the total several hundred dollars more. Specimens of the value of \$226 were selected from the above rock before crushing. The company have out 50 loads more of as equally good ore, and that which is being daily taken from the mine is of the same excellent character. This is a splendid result, and very encouraging to the company, giving them assurance that their purchase was a good one. This rock was taken out at a depth of from 100 to 120 feet. Everything about the Rocky Bar gives encouragement for the development of a rich mine, and the shareholders are in the best of spirits over the rich development that has been made.

PLACER.

DAMAGE TO DITCHES.—Dutch Flat *Forum*, Jan. 24: The high wind that prevailed on the 16th was the cause of doing considerable damage to the ditches in this vicinity. The South

Yuba ditches were broken in a number of places by the falling of trees, the repairing of which caused a delay of several days. The Miners' ditch was but little interrupted by the falling of trees, but sustained considerable damage by the blowing down of 36 boxes of a branch flume between here and Gold Run—standing on high trestle work—built for the purpose of conveying water to the Illinois mine. The Cedar ditches sustained but little damage. The flumes and pipes of the Little York ditches were considerably damaged. Several boxes of fluming, standing on high trestle work, immediately above Camel's Hump, were destroyed by the falling of trees, and 600 feet of the large iron pipe between Camel's Hump and Little York—also standing on high trestle work—were blown down. The pipes are considerably damaged by being bent and separated in places.

THE MOUNTAIN GATE MINE.—Placer *Herald*, Jan. 26: The old Mountain Gate mine at Damascus, one of the oldest drift claims in the country, having been opened in 1853, and now in some 7,000 feet, has been running rather light for some time past. Lately, however, they have struck gravel that is equal to the best ever taken out of that mine, and the stockholders, as a natural consequence, are feeling much revived in spirits. Where they are working at present the gravel pays at the rate of an ounce to the carload, and only last week the result of three men's labor aggregated \$360. The mine is owned by some 20 or 30 men who do most all the work themselves, and when they can realize from \$100 to \$120 a week each, they certainly have a good thing.

SAN BENITO.

QUICKSILVER.—Hollister *Enterprise*, Jan. 26: W. W. England exhibited in our office one day last week one of the richest and finest specimens of quicksilver ore we have seen for a long time. It was taken from the Mariposa mine, located in the Coast range, a short distance east of Hugh French's place. The claim is owned by Lige and Morey Stayton, D. England and Thos. Reed. The proprietors have run a tunnel some 40 feet, at which point they struck the lode from which the sample of ore in question was extracted. They have a number of tons of excellent ore on the dump, and plenty more in sight in the mine.

SIERRA.

STARTED.—Mountain *Messenger*, Jan. 26: The Sierra Buttes M. Co. have started a few stamps, but have not water enough to run any great number.

B. M.—We are informed that the Bald Mountain Co. have put about 40 men at work since water came.

SUMMIT.—There is from four to five feet of snow on the summit between Gold valley and Gold lake.

BUSINESS.—The owners of the Johnson quartz ledge, near Monte Christo, are pushing work, and will reach the shaft before long. They have fine quartz at the bottom of the shaft and a large ledge.

RUNNING.—The quartz mill at the Brush creek mine has been running about two weeks on rock taken principally from the upper levels. The rock is not considered very rich, but it is thought it will pay for crushing.

GOON WORK.—Messrs. Foss and Thompson have completed 190 feet of the tunnel to tap the Wilbourn Con. M. Co.'s ground. They have been at work about six weeks.

AT WORK.—We are informed that the Pliocene Co. are still at work sinking their shaft, using a tub to keep the water down.

TUOLUMNE.

MINERS UP AND DOING.—Tuolumne *Independent*, Jan. 26: A copious supply of water is flowing in the T. C. W. Co.'s ditch, the results of the recent storm, which high up in the mountains was rain instead of snow, as might be expected, at this time in the season. The miners in the vicinity are making the necessary repairs to flumes, tail-races, ditches, etc., preparatory to operating their respective claims. Mr. James Barron, who has erected a hydraulic elevator on his claim at Yankee hill is pushing the work forward to a final completion of all the details in readiness to commence washing. We learn that the only obstacle in the way of putting his elevator to work is the ditch which conveys water from the T. C. W. Co.'s ditch to the pipes that supply the giant and the elevator, it is in such condition he will not be able to run water on his claim until Monday next. The ditch was constructed last fall; a great portion of it is in a loose sandy state, which causes breakages and loss of water by leakage, to that extent that it will take three days more to put it in order for carrying a sufficient volume of water to operate with in the claim. It will require several hundred inches of water to operate upon the plan on which the claimants propose to work the claim. So we understand next Monday is the day fixed for the great event of putting in operation the first hydraulic elevator erected in Tuolumne county. It will be a notable event. If the machine can be operated successfully on Barron & Co.'s claim, it can likewise be employed to advantage and with profit in many localities in the county.

The miners about Columbia have now an abundant supply of water, and the gravel claims above are commencing operations.

Nevada.

WASHOE DISTRICT.

CALIFORNIA.—Gold Hill *News*, Jan. 30: Daily yield, 700 tons of ore, keeping the mills all crushing up to their full capacities. The ore

breasts on the 1500, 1550, 1600 and 1650-ft levels all show well and continue to yield the usual amount of rich ore.

CON. VIRGINIA.—Daily yield, 650 tons of ore. The mills are kept steadily running and the yield of bullion for the month of January will exceed that of any previous month for some time past. The ore breasts in all parts of the mine, from the 1200-ft down to the 1650-ft level, continue to yield their usual quotas of rich ore.

LADY WASHINGTON.—The main drift south on the 850-ft level is being pushed forward energetically to its connection with the drift being run north to meet it from the 1000-ft level of the Justice. The connection will be completed in the course of a week, when crosscutting will be commenced.

TROJAN.—Fifty tons per day continue to be the regular yield of the mine, and the ore stopes and breasts show no signs of giving out.

BULLION.—The north drift on the west side of the ore vein on the 1700-ft level is steadily advancing along the clay wall, and the east side of the drift showing a fine body of quartz of low grade. The face of the east cross-drift on this level, which was stopped a short time since, on account of a strong flow of water, shows beyond a doubt that the eastern limit of the ore vein on this level has never yet been reached.

OPHIR.—The west lateral south drift from the 1900-ft station is being advanced but slowly on account of the strong flow of water and the fearful heat. There is about 12 inches of hot water flowing from the drift in the face of which, in spite of all the air that can be forced in, the temperature of the air is 110° to 120°, while back in the drift, a short distance from the face it shows a temperature of 142°.

NORTH CON. VIRGINIA.—The face of the west drift on the 1300-ft level appears to have penetrated the hard country rock in which it has been running and is passing into a much softer formation of vein porphyry.

UNION CON.—On the 1600-ft level the course of the north drift has been changed from the joint Sierra Nevada winze to a nearly northeast direction, and if continued far enough in that direction, will, in time, connect with the North Con. Virginia shaft. Surveys lately made, and a thorough comparison of the results of the prospecting done heretofore, show, beyond a doubt, that all the prospecting done has been too far to the westward.

BELCHER.—The south drift on the 1900-ft level is making good progress. The west cross-cut on the same level, running to tap the water in the south incline, is also making good headway.

JULIA.—The new double hoisting engine was started up on Sunday last and works splendidly. The incline is now down 100 feet and the sinking now will be greatly accelerated by the use of the new engine in hoisting.

HALE & NORCROSS.—The pumps work splendidly and as steady as a clock. Owing to some disarrangement at the Savage during the past 48 hours, they have had the water to hold in check single handed, which duty they have performed in a first-class manner.

OVERMAN.—The south drift on 1400-ft level, running to connect with the Caledonia north drift, is being pushed vigorously forward and will probably complete a connection some time during the coming week.

SAVAGE.—The straps were put on the V-bob, yesterday, and the rear anchor bolts secured. The pump-rods are all in place and the entire pumping machinery from top to bottom has been overhauled, placing everything in first-class condition to again start up.

JUSTICE.—Daily yield, 80 tons of ore, keeping the Pacific mill crushing to its full capacity. The winze connections on the ore vein from the 700 down to the 1150-ft level has been completed, and a large amount of good ore stripped ready for extraction. The ore stopes on the 1150-ft level, going north, are widening out, and show a large amount of rich sulphurets ore.

SILVER HILL.—The east drift on the 800-ft level is showing some very handsome quartz and low grade ore in the face. Crosscut No. 2 from the south drift on the 600-ft level is also showing some very favorable streaks of ore.

YELLOW JACKET.—On 2200-ft level the main drift east toward the new shaft is now out 775 feet from the winze; the face continues in the same hard, dry ground. The crosscut west from the main north drift is in 105 feet and is running in quartz and porphyry. The crosscut east is in 90 feet and the face is in very favorable vein matter.

UTAH.—The south drift on the 1350-ft level is being pushed vigorously forward, the face in soft easy working vein matter.

MEXICAN.—The east joint crosscut on the north line is in quartz and porphyry mixed, which looks very favorable. The east drift from the bottom of the joint Ophir winze on the 1900-ft level is making fair progress, the face being in hard blasting rock.

BEST AND BELCHER.—East crosscut No. 1 on the 1700-ft level is being cleaned out and repaired preparatory to commencing a winze to prospect the vein in a downward direction at that point. This winze will be sunk perpendicularly.

GOULN & CURRY.—The foundation for the new air compressor is completed, and the whole will be in running order in a very short time. This compressor will add greatly to the ventilation and prospecting facilities on the lower levels when completed.

SIERRA NEVADA.—Sinking the double incline winze below the 1700-ft level is being pushed

forward with all the rapidity possible, the bottom being in good working ground, and the sinking progressing regularly at the rate of five feet per day.

CALEDONIA.—The rise of water occasioned by a recent breakage of some of the pumping machinery has been drained and worked resumed in all parts of the mine as before.

CON. IMPERIAL.—The north drift on the 2400-ft level, from the bottom of the south winze, is in a distance of 50 feet, the face in a fine character of vein matter mixed with quartz, which has a healthy look, and assays from \$8 to \$10 per ton.

CHOLLAR-POKOSL.—The flow of water is considerable, but is easily taken up and handled by the skews.

CROWN POINT.—Daily yield, 60 tons of ore from the old upper workings. The ore is being crushed by the Santiago mill at the rate of 50 tons per day.

SOLID SILVER.—The west crosscut from the main tunnel or adit shows improvement in the quality of ore encountered.

NEW YORK.—The bottom of the shaft is now all in quartz which gives fair assays, but not quite so good as were obtained a week ago.

SUTRO TUNNEL.—Total length of tunnel last evening, 18,819 feet. The face of the header is now in soft vein material.

SENATOR.—Negotiations are being made with Emmett, of the Gold Hill Foundry, to put the surface machinery of the mine in full working order as speedily as possible.

EUREKA DISTRICT.

MINING ITEMS.—Eureka *Sentinel*, Jan. 23 to 27: We shipped, last week, \$168,800 in crude bullion. The furnace pay roll of the Richmond company, during the month of December, amounted to \$12,000. The Richmond company smelted 3,600 tons of ore during the month of December. Another large cave was discovered in the Jackson mine, this week. It was broken into 60 feet below the 450-ft level and is filled with ore of a very high grade. Superintendent Shoehner informs us that steam hoisting works will be built at the Rescue mine at an early day. The Eureka ore dumps are filled to overflowing, both at the mine and furnace. The Eureka Con. company has disbursed \$950,000 in dividends in the last five months. Work is still being prosecuted on the Kit Carson mine. The property is opening out well. Large quantities of ore are daily shipped from the Connolly mine to the Richmond furnace. The value of the bullion yield of the Eureka Con., for the quarter ending December 1st, will aggregate \$950,000. Larry Hartnett, formerly chief engineer of the Savage mine, has taken charge of the new steam pumps at the K K Con. mine. Col. Taylor had a force of men at work, yesterday, cleaning out the flue at the Consolidated works. Over 500 tons of dust had accumulated in it. The rich strike in the Hamburg mine continues to hold out well, and the ore body in the winze on the 450-ft level is looking splendidly. The Eureka Con. company produced, during the quarter ending December 30th, 3,620 tons of crude bullion, or an average daily product of 39½ tons. The Richmond furnaces turned out over \$100,000 last week.

HUNTER DISTRICT.

CLOSED DOWN.—Eureka *Sentinel*, Jan. 26: The Hunter Con., Hunter district, of which property Mr. Dunne is Superintendent, is closed down for the present. The company's application for patents has been resisted, parties protesting thereto, and the company will not resume work until the question of title is settled.

WARD DISTRICT.

PROSPECTS.—Eureka *Sentinel*, Jan. 26: J. J. Dunne arrived in Eureka, yesterday, from Hunter district and intermediate points. He speaks in flattering terms of the mines at Ward, and is satisfied that next summer will witness renewed activity all along the line. He brought with him some rich specimens of ore from the Paymaster and Pleiades, taken from recent developments made in those properties. The main shaft on the latter is down 230 feet and the ore body at that point is four feet in thickness and of very high grade. On the first level a drift has been carried a distance of 180 feet, in ore all the way. The strike in the Paymaster is very encouraging and insures both the future of the mine and district.

WHITE PINE DISTRICT.

STRIKE IN THE JENNIE A.—White Pine *News*, Jan. 26: We learn that an important strike was made in the Jennie A mine, on White Pine mountain, the fore part of the week. At a depth of 350 a four-foot vein was struck, which is said to present a fine appearance. The Jennie people have now reached a depth never before attained in the base metal mines of this district, and the finding of a large and well-defined vein at such depth cannot but greatly encourage the company in the work of prospecting.

Arizona.

LIVE YANKEE.—Arizona *Sentinel*, Jan. 26: The Live Yankee gold mine, a few miles above Yuma, is now being opened up in a way to make it a valuable property. The mine lies close to heavy bodies of timber and within a few hundred feet of the Colorado river. It was worked and yielded nearly \$30 per ton; at that time that was too low a yield to create even a ripple of excitement and nothing more was done. But now there is a railroad within a few miles of the ledge, and if the boys can open up a good-sized body of \$30 rock, the mine has a big cash value.

PIONEER DISTRICT.—Late advices from Pioneer district report everything running quietly and regularly at the Silver King mill and elsewhere. Power's suits against the Masons have been compromised and withdrawn. Baldwin and others are to put up a five-stamp mill and concentrators on Queen creek, about a mile above Picket Post. Twenty tons of the machinery, etc., are due here next week. Two thousand tons of ore have been contracted for with Mr. John Dore.

The placers around Gila City are gradually attracting more attention, quite a number of men are now at work there and considerable gold is being taken out. Mr. J. Brown brought in a nice bag of dust from there last Thursday.

Mr. E. Power, of London, was here a couple of weeks ago in the interest of the English capitalists for whom Ogilby bought the Carga Muchacho mines from Van Arsdale. His visit has in some way dried up the litigation with which the outfit was slopping over.

Work is now well under way on the Genesee and Eureka Bonanza mines, of Eureka, next above Castle Dome district, under the auspices of San Francisco parties. Some ore is being taken out, but most of the work is being directed, toward opening up the mines. A pump has been rigged on the old shaft and is keeping down the water which formerly drove the miners out. There is quite a shipment here of material and supplies, which will be forwarded to the mines by first boat.

PECK DISTRICT.—Enterprise, Jan. 23: T. L. Edwards came in from the Peck last evening. He brings good reports of the mines, but says there is some dissatisfaction in the minds of Peck and Warrior miners concerning the non-appearance of paymasters.

HUMBURG DISTRICT.—Mr. Rowe, of the mercantile firm of Anders & Rowe, arrived here from Humburg district a short time ago. The news he brings is that Miles & Belcher have struck plenty of rich ore in the Julius lode, which is about midway between Tiptop and Swilling mines. The Tiptop company have contracted with Simmons & Monick for the packing of 1,500 tons of ore from their mine to the head of the wagon road, distance about four miles. Their mill is about 10 miles from the mine. The snow was melting, in consequence of which water had commenced running in creeks and gulches.

Idaho.

GOLD HILL MINE.—Idaho *Statesman*, Jan. 26: Mr. C. E. Clark, brother of Hank Clark, of Horseshoe Bend, called on us Thursday. Mr. Clark is one of the efficient workers employed at the Gold Hill mill in Boise county. He says the company are now working a force of 60 men. The 25-stamp mill is pounding away day and night on good ore, crushing at the rate of 50 tons per 24 hours. The ore from the lower level is steadily improving in quality with a sufficient quantity in sight to run the mill for several years to come; but the company have determined to penetrate the mine to a depth of 100 feet below the present lower level with a perpendicular shaft, which is now down 125 feet below the first level though the shaft does not follow the direction of the ledge, it is nevertheless passing through ore seams which increase in width and richness as it progresses. The mine has been demonstrated to be a true fissure vein, and there is every indication that all the scattered and interrupted seams will unite below in a continuous body of rich ore. This mine has been worked for several years with constantly increasing profit to its enterprising owners. As to the yield per ton no estimate can be had, but as the owners are prosperous from the yield of the mine, while the scale of operations is large and the expenditures great, it may be taken for granted that the returns are in proportion. This is a mine upon which no borrowed capital has been used, no assessments levied, and whose expenses are promptly and punctually liquidated, thousands of dollars being disbursed for labor and material every month.

POTOSI.—Owyhee *Avalanche*, Jan. 26: Operations were resumed at the Potosi on Monday last under the direction of one of the leading merchants of this city, who is largely interested in the property.

At the Black Jack the shaft is down a depth of 125 feet. In both stopes on the first level the ledge has a splendid complexion and much rich rock is being taken out.

Work was resumed on the Leviathan mine on Florida mountain yesterday, and a considerable quantity of good ore will be sent away from there in a few weeks.

Montana.

PHILLIPSBURG ITEMS.—Cor. Butte *Miner*, Jan. 26: I found Phillipsburg very prosperous, the Northwestern and Hope mills both running and turning out plenty of bullion, while the ore in sight at the Trout and Hope mines is amply sufficient to keep them running for a long time to come. It is safe to say that Phillipsburg never shows such evidences of permanent prosperity as now. The Trout mine is developed by shaft to the depth of 327 feet, with many hundreds of feet of drifts, levels and inclines, from which many tons of ore is being taken with a very small force, and at very small cost. There is a splendid showing of ore in nearly all the openings. No mine in Montana has passed through a more trying ordeal than the Trout, and none have come out more triumphant. Being more than 100 feet below the head of Trout creek, and still in good ore, the hueghar of the water level doesn't frighten anybody. The ore

vein, although continuous, is like all deposits of ore in lime, very irregular. It occurs in chambers, some of which are very large, but whether large or small the ore produced is always very rich. I think it would be very hard to find ore more refractory than that taken from the Trout, and yet Mr. Speckart seems to have no difficulty in extracting the silver to a very high percentage of its assay value.

News in Brief.

The schooner *Sarah A. Owens* was wrecked off Mendocino, on the 26th.

Hon. W. Z. ANONEY, Senator from Santa Clara county, died on Sunday night.

Geo. P. GORDON, the inventor of the Gordon press, died at Norfolk, on Sunday.

The House Railroad Committee seems favorably disposed towards the Texas Pacific.

The project to put certain banking houses on a gold basis is said to be strongly supported.

Since the Eastern war began the demand for sole leather from this country has greatly increased.

A SECOND unsuccessful attempt has been made to rob a train on the Atchison and Santa Fe railroad.

The Russians, Servians, Roumanians and Montenegrins are pushing military operations with great vigor.

The House Committee on Naval Affairs recommends an appropriation of \$50,000 for the Howgate expedition.

The Russian corvette *Craysser* Capt. Nascioff, is in port from Callao. She carries 18 officers and 120 men.

A NUMBER of army officers have been appointed on the commission to inquire into the recent Rio Grande troubles.

The steamer *Amador* is now on the ways at Oakland point, and is to be transformed into a double-ended for the Oakland ferry.

The yacht *Tidal Wave*, is stated in a dispatch to have been purchased from New York owners by D. Cook, of this city, at a cost of \$9,500.

The cigar makers' strike in New York has failed after four months' struggle. The men are generally seeking work again at the manufacturers' terms.

SEVERAL free lunch rooms for needy persons have been established in this city, and the result shows the necessity of even more of such institutions.

The French Academy of Sciences has awarded the Lalande prize of astronomy to Prof. Hall, the American discoverer of the satellite of Mars.

THERE has been considerable excitement in New Orleans, caused by the conflict of Federal and State jurisdiction in the trial of members of the Returning Board.

The Bank of San Francisco has ceased business. The depositors are already paid in full and it is stated there are enough assets to settle with stockholders.

The Emma mine case is to be revived at Chicago, Frederick A. Bragg suing for \$250,000, and \$1,000,000 damages. He alleges that Parks defrauded him in the sale to the English party.

GREAT excitement has been caused in San Domingo and Hayti by the rumor that Spain will soon sign a treaty assuming a protectorate over the islands. It seems to increase the unpopularity of President Baez.

A DISPATCH from the United States Vice-Consul at Shanghai, asking for funds, says: "An appalling famine is raging throughout four provinces of North China. Nine millions of people are reported destitute. Children are daily sold in the markets for food."

The ship *King Philip* was wrecked just outside the Golden Gate, on Friday last, and on the same day the ships *Western Shore* and *Don Nicholas*, came near being lost in the same place. Capt. Blinn of the *Western Shore* was killed by the parting of the tug's hawser in the effort to get the vessel off the lee shore.

The Pacific Mail Steamship Company have decided to double their carrying service between New York and Aspinwall, and Panama and San Francisco, in order to meet the present pressure of freights, which are represented as more than a semi-monthly line of steamers can accommodate. It is proposed to hereafter send out a steamer every week.

CAPT. EADS last week received a warrant for \$500,000 on account of his improvement of the South Pass of the Mississippi and securing 22 feet of water. He had previously received a like amount on the same service for 20 feet. He gets half a million for each additional two feet up to 30 feet, and then \$100,000 a year for 20 years, to keep it up to that standard.

OUT of the 300 persons who partook of a free lunch at Dr. Jewell's church Sunday, 35 signed the pledge to abstain from liquor, while at the Green Street church out of 200 who came to the dining table as many as 70 took the more general pledge that they would abstain from the use of liquor and tobacco and would not indulge in profane swearing or stock gambling.

The anti-subsidy resolution adopted in the House of Representatives by a vote of 147 to 85 declares that, in the judgment of the House, no subsidies in money, bonds, public land, endorsements, or by pledge of the public credit, should be granted to or renewed by Congress to associations or corporations engaged in or proposing to engage in public or private enterprises; but that all appropriations ought to be limited to such amount and purposes only as shall be imperatively demanded by public service.

THERE are 300 students at the State University at Berkeley.

LEW WING, a Chinese murderer, was hung at San Rafael, on Tuesday.

ADVANCES from Samoan group of islands state that the war there is ended.

CONCENTRATION of the Russians at Adrianople continues.

The Turkish government is having difficulty to maintain order in the Capital.

The labor agitation has subsided and the militia have retired from duty.

THERE are over 300 artesian wells in Santa Clara valley, Cal.

An immigration agency for Washington Territory has been established in this city.

The citizens of Berkeley are agitating the subject of incorporating the town.

The Shah will soon start on another traveling tour through Europe, this time incognito.

The wine crop in France for 1877 proves to have been a fair average one of good quality.

It costs \$160 to reach the Black Hills from San Francisco, and the passage consumes about six days.

At Santa Cruz, on the 28th, the blacksmith's shop and storeroom of the Felton Railroad Company were burned.

The Garka rebellion (Africa) is spreading and its suppression is improbable before the arrival of reinforcements from England.

HENRY MILLER, Vice-President and one of the firm of the bank of D. O. Mills & Co., died on Tuesday at his residence at Sacramento, aged 71.

The *Call* has a new Hoe press on the way from New York which will print 30,000 copies of the *Call* on both sides and deliver the same ready folded for the carrier in an hour. The *Call* has also on hand a new dress of type.

Those deeply interested say the President declares he will not ask the present Congress to make an appropriation to pay the \$5,000,000 awarded to Canada by the Fishery commission.

The grand jury of Jacksonville, Florida, have found indictments in 17 cases against alleged timber predators in that State, involving immense values in lumber, timber, tar, turpentine and resin.

The *Caroline Melau* cleared, on Saturday, on a wrecking and fishing voyage, her cargo consisting of a lot of machinery and apparatus, to be used for wrecking purposes at the wreck of the steamer *City of San Francisco*.

DURING the past week the receipts from internal revenue in this district aggregated \$58,033, of which \$38,860 came from semi-annual taxes on bank capital and deposits, and \$13,013 from tobacco, cigars and beer.

COLONEL BEE has received a number of orders for Chinese laborers recently from the Eastern States. A coal mining company in Missouri has contracted for 500 coolies to work in the mines, and another order for 200 comes from Arkansas.

CALIFORNIA street, between Kearny and Powell, has been washed out to such an extent by the recent rains as to delay for an indefinite period the putting on the cars of the California-street Wire Railroad Company.

A ROMAN dispatch says: The Pope is preparing an allocution against Russia for the persecution of the Church in Poland, and against King Humbert and his accession to the throne for the assumption of the title of King of Italy.

An attempt made at Montreal, on Monday, to blow up the Canadian Institute building, was averted by the timely discovery of an explosive package in the main hall. This is the Institute which Guibord joined and for belonging to which he was excommunicated.

The Postmaster-General has issued an order that the regulation of the Department relative to local papers at letter carrier offices, is modified so that paragraph six shall read "weekly newspapers to transient parties, one cent each, to be prepaid by postage stamps affixed."

LORD DREBY, telegraphed to Lord Loftus, British Ambassador at St. Petersburg, January 28th, states that Count Schouvaloff that afternoon communicated a telegram from Prince Gortschakoff, authorizing him to affirm categorically that the Russian government considered the passage of a man-of-war through the Dardanelles and Bosphorus a European question which they did not intend to settle by themselves.

The New Bedford *Whaleman's Shipping List* says that the North Pacific whaling fleet was very successful the past season. The catch was small until September, when whales were found plenty and large fakes were taken. Three vessels were lost, and 16 vessels came out with an average of 1,065 barrels of oil, and 8,550 pounds of whalebone.

ACCORDING to the table prepared by H. C. Hoyt, the marine reporter of the Merchants' Exchange, 22 vessels in all were built on the Pacific slope during 1877. There were 6 scow schooners built, ten schooners, one bark, one harkentine and four steamers. The aggregate tonnage was 3,640 tons. The cost of steamers complete was about \$195,000; of sail vessels complete about \$250,000. Total, \$440,000.

The Sutter claim, which has been before several Congresses, was considered by the Private Land Committee. Sutter claims to be the original discover of gold in California. His claim is for lands that have been granted him by the Mexican Government before California was acquired by the United States. The Committee of the last Congress reported favorably upon the claim giving him \$50,000 in lieu of his claim, but the Senate did not consider it.

Prospects in Arizona.

We are requested to say something about the prospects of this country for the coming season. Well, they appear to us to be "bully." If we were writing to our kin—say Uncle Robert and Aunt Rachel, or to anyone of their 14 or 15 sons and daughters, who are our dear cousins—we should probably tell them as near the truth as we knew how, and this is about what we should say: "Times have been a little tight for two years past, we must confess, and occasionally some of the people get tighter than the times; now and then one gets 'tight as a brick.' Your respected cousin, however, maintains his equilibrium, and is, if anything, a little 'loose,' not so much in his morals as in his habit of doing a large amount of labor without exacting adequate compensation. This, however, is the natural outgrowth of a great moral reform, a revival, so to speak, which always follows in the wake of civilization, and tones down prices as well as society. The pioneers of all new countries are apt to strike a high key, run business on the high pressure system, and have a good, free and easy time of it until the Moodys and Sankeys and Hammonds and Van Cott's, of trade, as well as of morals, find their way into the wilderness, and overturn the pioneer system of business first, of morals afterwards, and finally we find ourselves assimilated with the great mass of mankind throughout the world; the mining camp of the mountains is scarcely less or more than a New England village, and the pioneer is again ready to pick up and move on to find another wilderness."

These are some of the prospects of which we should write to our kin, with the secret hope, perhaps, that they would not like the picture, and would stay at home, but there are other and more tangible indications of coming prosperity that ought not to be entirely overlooked. Within the year several new mining districts have been opened in Arizona, and a large number of important mining enterprises started, some of which are already in successful paying operation, as the Signal and others, and a number are just on the eve of starting their works, as the Tiptop, Black Warrior, McMillen, etc., while a greater number are developing with a view to putting up works, as the Tiger, California, Little Mack, and hundreds, almost, the names of which we do not call to mind at the moment.

These, with the already successful works, before the beginning of the year that is just passed, as the Peck, McCrackin, Hackberry, Silver King, etc., give assurance of pretty fair times ahead. And so on this account, we should intimate that, while it might not be just the thing for the heads of families to sell their farms and rush off to Arizona, yet, if any of them should have a few thousand dollars to spare, it would not be a bad idea to fit out some of their wives' younger brothers, and send them out here on a prospect. "What man hath done, man may do," and as men have found rich mines in this country, these young men would, at least, find a chance to "strike it big," and if they didn't, the country would have the benefit of the money spent, and this is another of the prospects of which we should write.

The country is full of prospects; of course they are not all bright, nor should they be; if it were so, it would beget monotony, and people would have a surfeit of brightness, perhaps an attack of "Bright's disease." The dark spots in the life of a prospector give zest to his occupation, and by contrast render the bright ones a thousand fold more attractive.

These are the prospects as they present themselves to us, "where we sit," as Waddy, the stage-driver used to say, and we give them to you as Gospel truth.—*Arizona Miner.*

Why Prospectors Seldom Get Rich.

Many who not familiar with mining, its drawbacks, its expenses, etc., wonder how it is that so few of our prospectors become wealthy. But it should be remembered that large expenses attend the opening of a mine, digging and blasting through solid rock, making openings for working and ventilation. When fully understood no one will ask why one person does not succeed. If his bank account is large enough he will. Look at the cost of the openings and machinery on the Comstock, the richest of the rich. Does anyone think that one individual could stand it? So it is with the prospector. He finds the mines, and as a miner knows he cannot go into the earth and open up the mine on a paying basis; he knows he must contend with hard rock, must timber, must open levels and air passages; he needs machinery to pump and to hoist, and then, after his ore is on the surface, what has he? A lot of rock containing precious metal, with a lot of base metals. This must go through a process of working that requires more machinery. He has no bank account, owes the tailor for his clothes and the grocer for his grub, and must sort out the best of his rock and sell it at a sacrifice to keep him in daily bread. Is it not wise to sell his claim for a few thousand dollars and return to his old home in the land of civilization? Yet how few do it. He cannot resist the love he has for the miner's life, the charm of being away from all the works of man, alone with God and nature, delving into the mountain, prospecting the gulches and ravines, in hope of finding the miner's greatest hope, a bonanza of gold on the surface, as was found in early days in California, in place of which he finds silver, or lead, or copper. If these show well he tries them, hoping that he

may develop something that will attract the monied men of the cities, and then make another stake for himself and visit his old chums at home.

Mining, like all other business, must be conducted with economy, and wants a practical miner at its head. Nearly all the failures of eastern investments have been caused by sending out some friend or relation of some of the company to take charge of the mines, who has not the slightest idea of how silver and gold mines are found, let alone how they should be worked. What can such persons be expected to know of mining or to get the precious metal away from the base?

Theory is good and practice is better, but theory and practice are far above either alone. Let your metallurgical students go into the mines and there learn to swing the pick, to drill, to blast, and to distinguish ore from barren rock; let them go into the field and become familiar with the practical part of mining life, and then less money will be thrown away and squandered, and many a valuable property, in place of being condemned, will be made to yield many returns for the money invested.—*Arizona Sentinel.*

Idaho's Best Mines.

A correspondent of the *Idaho World*, says: There has been a difference of opinion among the mining men, even of this county, as to whether the mines of Boise county or the famous silver mines of Atlanta produced the most bullion this year. Although an immense amount of bullion has been shipped by the Monarch and Buffalo companies, we contend that the gold product of the quartz mines of the Basin is greater. Our mines contain free gold, and the cost of milling the ore is small, about \$4 per ton. The cost of extracting the ore from the mines is but small, as very little powder is used. Timber is no object, as the country for miles around is a dense forest. Taking everything into consideration, the advantages we have are far superior to those of any other mining district on the coast, or the Black Hills. I can safely say that we can show a greater proportion of dividend paying mines than any other section. The number of ledges worked in the county last summer, as near as I can ascertain, was 16. Those claims working but a few men I do not count. Out of that number, 12 paid dividends. It is generally considered throughout Colorado, Utah, Nevada and California that the percentage of paying mines is as one to five. It is a singular fact, nevertheless true, that every one of our mines are worked by home capital. This is the cause of them being developed so slowly, and with but little profit on the start. Take, for example, the Ebenezer and Belsbazzr mines, on Fall and Canyon creeks, where they were compelled to pay \$8 per ton for packing and \$8 for crushing in a custom mill. Here is at least \$11 dollars per ton lost to the owners by not having mills at their mines. Consequently proprietors of ledges must work a long time to secure sufficient means to erect mills. It is only within the last few years that any attention has been given to quartz in this vicinity, and already we have four mills in operation—one 25, one 20, and two 10-stamp mills run by steam, with a 10-stamp water mill. Besides these, there are two on Summit flat, one of which will start up as soon as spring opens, and probably both. The mines of the most notoriety are the Gold Hill, Sub Kosa, Belsbazzr and the Banner mines. Any of these in Nevada or Utah would be worth \$500,000; but because they are so unfortunate as to be situated in Idaho, they can scarcely be given away. For instance, the Belsbazzr was bonded to James Monroe & Co. some time ago at a very low figure, with the intention of getting an Eastern company to invest. Mr. Monroe was given the bond because he is acquainted with moneyed men who expressed their desire to invest in mining. He thought he had but a small task before him, but he has concluded that if he succeeds in giving this mine away he will not soon make another attempt to bring capital from the East. And so it will be till some venturesome, enterprising company makes a start, for capitalists are like sheep and follow the leader. The first companies that invest in new districts generally get good mines and raise the excitement. The cost of machinery is not as much laid down here as in the Black Hills, nor are goods so high, yet capitalists prefer to go there because that district is nearer the Eastern markets.

Charcoal Statistics.

We obtained yesterday, from a gentleman who has devoted considerable study to the compilation, and who has procured the figures for the use and information of a Government Department, some interesting statistics in regard to one of our leading industries. The business of coal-burning is second in importance to that of mining, although wholly depending on the latter for its prosperity. As the ores of the district will never be profitably utilized, nor worked by any other process than at present obtains, unless some inventive genius makes a wonderful discovery, any figures relative to the area and extent of the future supply must necessarily be instructive. It is likely that the demand will increase, and in the light of recent developments in our mines, double the amount used at present will be needed for the coming season. There are only seven smelting furnaces in operation at the present time, or less than half the capacity of the district, there being 15 all told. It is probable that nearly all of these

will be at work by the first of June. The present daily consumption is about 8,000 bushels, which in the last five months, reckoning from the starting up of the Richmond and Eureka works, and allowing that, with the K K Con., seven furnaces have been in constant operation, will show a consumption of 1,250,000 bushels. We make the calculation because we believe that the statisticians' figures on the item of consumption for the last five years is below the mark.

The following is the result of his work: There are 800 coal burners employed in the trade, 90% of whom are foreigners and about 50% of the latter are American citizens. With a few exceptions this force is in the employ of less than a dozen firms, two-thirds of whom are of foreign birth. The average distance that the coal is hauled by teams is 35 miles, ten companies owning the outfits. There has been consumed within the last five years 6,000,000 bushels of charcoal, and it is estimated that there is timber enough standing within a radius of 60 miles, to produce 25,000,000 bushels. The regulation standard allows 33 bushels of coal to one cord of nut-pine wood, but this is not correct, actual experience proving that it will not produce more than 28. It will be seen that there is not quite 1,000,000 cords of wood in the growth of timber on the hills and mountains, and probably one-third of this is not available. At the present rate of consumption, our supply will be exhausted in eight years, allowing that every stick of growing timber can be utilized. At the price ruling in Eureka, (25 cents per bushel) the article remaining to be marketed in the future has a value of \$6,000,000.

If the mines of Eureka district remain permanent, and do not give a larger output of ore than at present, we shall be forced to look to the dense timber growths of the Sierra Nevada for our future supply.—*Eureka Sentinel.*

Benton, Mono County.

A correspondent of the *Inyo Independent*, writing from Benton, Mono county, says: Benton has been some place since 1863, that being about the time the mines were discovered here, which have proved to be true fissure veins, bearing rich ore. From 1863 to 1872 the miners shipped their ore by Creaser's teams to Reno for reduction, not being able to build mills of their own. About 1872 a mill was built by a company styled W. J. Williams & Co., which proved to be a curse to the camp, as the company were a set of bilks, and came here for the purpose of bilking the honest miners out of their valuable ore, which before they had been sending to Reno. But after bringing their curse upon the camp (viz., their failure to work the ore), they left the place the worse for their enterprise. The second unsuccessful attempt at fraud upon the people was inaugurated by Bill Leet, who started in on the Williams & Co. plan. He found it would not work, and then sold out to Albert Mack, for exorbitant figures. But Mr. Mack and C. H. Aaron, his superintendent, proved fully equal to working this ore, and made a complete success of it, which proved a year of jubilee to the miners. Up to this time all that could be called Benton was taken out of the mines, shipped to Reno in the shape of ore and returned in merchandise and mining supplies. Since then the boys have a bit or two "to throw over the bar," as they say. During all this time the town has maintained a gradual, healthy growth, and the "bottom" has never dropped out of the place, and, as a friend (who is a mining engineer, and whose business called him away), remarked, "Benton will be a flourishing mining town long after you and I are gone."

We doubt very much if a long etring of how the Comanche, Diana, Kerrick, Eureka, Laura, Centennial, Lyford, and dozens of other mines were progressing, and how their respective superintendents were sinking, raising, drifting, crosscutting, leveling, stopping, tunneling, timbering, and teasing the very bowels out of mother earth, would interest your readers, or I would give them a "game" on that topic to prove that there is really a place called Benton, and that mining is the principal business. But we do not wish to mislead the weary traveler, who might accidentally be going to Bodie, and get him to stop here. Neither do we wish to advance the idea to capital that Benton is the place to invest money, but we propose to move on at our gradual, healthy pace, and we believe our future will be good and well developed mines, a healthy state of commerce, and capital invested here be, as in times past, paying dividends.

Lake District

Bids fair to be a mining camp of considerable note, and we hope are long to give a report of that place that will warrant prospectors in pointing that way, and open up mines worthy the attention of capital. At present, however, with the thermometer at 38° below zero, I could not recommend Lake district as a very congenial field of labor.

ASBESTOS.—Mr. S. V. Carter has found a deposit of asbestos at the mouth of Stony creek, near Jackson valley, in Amador county. The *Ledger* says that the ledge so far as opened is three feet wide. The specimens left with us are merely croppings, and are therefore hard. A few feet from the surface, however, there is no doubt that it will be found soft and fibrous, and almost pulpy. Deposits of asbestos are met with in many places in Amador county, but not one of them is being worked.

More Safety Demanded.

It is the height of folly for any of the mining companies or managements of the Comstock to ignore their responsibility, as well as possible cost, in making their surface engineers work too many hours on a shift. A very significant as well as terrible warning was conveyed in that respect on Saturday last at the Savage mine, whereby a momentary inadvertency of a tired engineer on a 12-hour shift, a cage with four men on it was run up to the sheave, and one man precipitated 1,300 feet down the shaft to his death. By this blood-curdling accident a widow with a large family of children is left to mourn the loss of a kind husband and father and their main support. Such economy on the part of a responsible mining company in trying to save a few dollars by making their engineers work longer shifts, thereby employing less of them, is not only a bad financial proposition but positively criminal. In some little outside mine, where the work of development goes slowly forward, and an engineer has only occasionally to step in and attend to his work, this might be excusable; but never in the case of first-class, actively working mines where the lives of men are every moment at risk, and under the constant responsibility of the engineer. Even the most careful is liable to become wearied by long-continued vigilance and overstrain of his ability, and a momentary relaxation or benumbing of his overwrought sensibilities may, during that moment, as in the case in question, result in death and distress, to say nothing of the pecuniary loss and damage. Overtasked human nature will not always do to rely upon.

We are pleased to see that the fraternity of Stationary Engineers have taken this matter seriously in hand and will hold a meeting in Gold Hill this evening at Miners' Union hall. They invite the engineers of Virginia City to unite with them, and the result should be that no more 12-hour shifts will be ruleable for engineers in any of the mining works of this section. More safety is demanded in this matter. The arrival of a cage loaded with ore or men at the surface is a critical point in the duty and observation of an engineer. The distance is, about that time, very short between safety and destruction, and it requires the utmost care and vigilant, wide-awake watchfulness on the part of the engineer on duty to guard against possible accident.—*Virginia Enterprise.*

Plenty More Left.

The rich silver croppings of various districts of Arizona have been traveled over for years by prospectors and "rule-o-thumb" miners and experts, without any recognition of their value. It is only within a couple of years that silver has been known in the Silver King and Peck mines, although the Stoneman Grade passes right across the former, within a few yards of ore worth hundreds of dollars per ton, cropping out to a height of 20 to 30 feet, and is a road that has been traveled for years. The trail across the Peck mine is one of the oldest in that section. Float ore, worth thousands per ton, was found by Ed. Peck in a spring near the mine, at which hundreds of prospectors have camped. Thousands of men have ridden across the Peck without dreaming of the wealth spurned by their horse's hoofs. The Silver Prince is a ledge parallel to and near the Peck. The trail crosses it also and had worn quite a channel through the soft ore. Little more than a year ago, Houghtelien gouged out for us, right in the trail, a specimen which we had assayed in San Francisco, and which gave a result of nearly \$8,000 per ton. Even at that time, 18 months ago, the Black Warrior was looked upon merely as a pretty good prospect. The Tip-top is another new discovery of silver made in a section that has heretofore been exhaustively ransacked in search of gold. The famous McCrackin is a bold ledge, visible for miles from the principal trails through that part of Mohave county. Yet its location as a silver mine is comparatively recent. What we want to show is that there is still immense tracts in Arizona that have never known intelligent prospecting for silver. The facts just cited seem to prove it. Nearly the whole of Yuma county comes within that category. Of all the men who have run over it for gold, not one in a thousand knows silver croppings when he sees them. Of late, the best traveled trails and the oldest known sections of Arizona have been more prolific in rich silver discoveries. We firmly believe that rule to still hold good and predict many a bonanza to be shortly exposed in this old county of Yuma.—*Arizona Sentinel.*

TIN MINE DISCOVERY.—One of the most important discoveries ever made in this county has been brought to light by Mr. C. P. Converse within a day or two. For several years he has been digging into what he believed an iron vein of immense size, under the belief that iron associated with granite always contained gold. A specimen of the ore was brought to our office last summer, and another specimen forwarded to New York, and thence to Swansea, in England. This week he receives the report that the latter specimen gave 60% tin. Tin is one of the most valuable of metals, and its principal ores have been worked at a greater percentage of profit than any other metal. The mine is located in the extreme northeast of this county, and in just the formation in which this variety of ore always occurs.—*Visalia Iron Age.*

The "Tuscarora's" Surveying Cruise.

The United States steamer *Tuscarora* has been assigned to special duty connected with the survey of the Pacific coast, probably extending down as far as Panama bay. For several years, says the *Alta*, the Hydrographic Office has appealed to Congress for an appropriation large enough to enable it to construct at least two vessels of suitable size and rig, with which to make this survey. From Panama northward we have but imperfect charts, and have to rely upon Captain Belcher's, which, while in the main they serve their purpose, are in many essential and vital particulars grossly in error. The most important of these errors is in the coast line of Guatemala and Salvador, the western coasts being on the existing charts too far to the eastward, and the southern coasts too far to the northward. From actual observations, now pretty well confirmed, the errors range from 12 to 20 miles, and are continuous for several hundred miles. Few, if any, of the reefs, rocks, or outlying dangers are correctly located, and but little of the currents or the true set of the tides are known, and consequently with our increasing use of this coast, it is time that a correct and careful survey of this part of the globe should be made. The commanders of the Pacific Mail Steamship Company have made many surveys which have been of great value to the company, but the only result of any of their labors which has ever been put in print was a small but valuable little work entitled "Remarks on the Navigation of the Coast between San Francisco and Panama," by W. H. Parker, Captain P. M. S. S. Co., which was issued in 1871, and an appendix dated 1873. This work was published only for the use of the company's officers, and could not be obtained by navigators generally. Hence it was to a great extent a "sealed book." Murray's sailing directions for the coast were written in conformity with Belcher's chart, and although corrected from time to time, retained many of the original errors. A correct chart will be very valuable to the maritime world, and especially to our steam and coasting traders, many of whom have been deterred from chartering for this coast because of its unsurveyed and consequently dangerous character. If the Central American governments will now supplement the work about to be done by the United States Hydrographic Office by the erection of light houses, say at Champerico, San Jose de Guatemala, Acajutla, La Libertad, La Union, Amapa, etc., they will aid navigation very materially, and it will be a most profitable investment. Punta Arenas and Realejo are the only ports on the Central American coast which can boast of fixed light-house service. Acapulco has a light which is only lit when a Pacific Mail steamer is expected, and this light is owned and lighted at the company's expense.

Resting Springs.

Parties who have lately arrived from Resting Springs do not give very flattering accounts of that mining section. The reason for the dullness of all kinds of business in that camp is fully shown by a letter received from a reliable party there. He says that they receive mail matter about every 10 days. The stages that were running from Mohave to Resting Springs were discontinued about the middle of November. Three stages are running from San Bernardino, each one requiring about three weeks time to make the round trip. There is nothing very flattering in the prospects of the camp at present, everything going very slowly. The small furnace that was started some time ago was shut down about the middle of November, and the men discharged. The furnace was found too small to be of any practical use for the class of ores they have there, which are difficult to smelt. Everything seems to depend upon the operations of one company, and that one not overburdened with capital. Mr. Osborne, the Superintendent, has gone to San Francisco to purchase a larger furnace, and the writer of the letter understands that the furnace is now en route to that camp. When Osborne gets back it is supposed operations will be recommenced. The writer of the letter is an old miner and gives it as his opinion that the company would do a great deal better with a mill instead of a furnace, as the ores of that district come nearer to being milling than smelting ores, and those from the surrounding mines are nearly all smelting. He thinks the mines there would furnish ore enough to keep a mill running all the time. He is afraid "that the camp will continue to be dull unless some other company takes hold of the mines and does something." All are anxiously waiting for capital to come in and make times better. He says there is at present no money at all, and scarcely any business being done, although everybody is anticipating better times soon and are building great castles in the air. For all this, improvements in the way of building are going on. The writer says they have good mines and men are kept at work in them all the time taking out ore. Several hundred tons of ore are at the furnace dumps, also a large supply of coal, and several men are employed in the mountains burning coal. He says: "No one here knows what is going to be done, all anxiously awaiting the return of Osborne." Let us hope that the coming season will bring good times to Resting Springs as well as many other outside districts, and we believe it will.—*Coso Mining News.*

USEFUL INFORMATION.

Valuable Woods for Carving.

The *Crockery and Glass Journal* appears to have examined this subject with care, and the results will be of interest in this State, where much of the timber mentioned is in vigorous growth. We read in Calvert's *Mechanic's Almanac* that lime wood was almost exclusively used by Grinling Gibbons, for all his magnificent drops and festoons of fruit, flowers and birds, at Petworth, Chatsworth, Burghley, Belton, Melbury, Gattton, and the numerous other noble seats to which his genius has imparted such a charm. Lime tree is soft and pliable to the tool, and less liable to split and splinter than almost any other wood, which qualities render it of great utility to carvers for carrying out designs when lightness and boldness are equally required. It takes a stain well, and a fair polish, or it may be varnished without greatly altering the color of the wood, but giving it a very agreeable box-wood appearance. As well as for large festoons, it is suitable for smaller works, such as book-stands, miniature and portrait frames, etc.

American walnut is a very good wood, and is much in favor for its dark color. It has, however, a more open grain than lime, and therefore requires more care to avoid accidents. It is used for many small works where much projection is unnecessary, as boot-racks, watch-stands, etc. Sycamore, holly and chestnut are amongst the lightest of our woods. The first is greatly, and in fact, principally used for bread-plates, potato-bowls, and other articles where a light tint is a consideration.

Among the hardwoods, oak may be recommended, as also Italian and English walnut. The former from its hard and enduring nature, should as a rule be chosen for executing finials or pew heads, alms-boxes, church and Gothic work in general. It is also much used for clock and hall brackets, and for other pieces of solid furniture. Italian wood is a rich and beautiful wood for a variety of purposes, such as cabinets, book-cases, frames, etc. It is hard, but the effect produced by its use amply repays the extra labor caused by the close texture of the material.

When any very delicate designs have to be executed, and the most minute finish is required, box-wood, ebony, or any other equally hard and close-grained woods are decidedly the best to choose.

Pear tree is a pleasant wood for working, and a good piece resembles lime in its pliability. It is extensively used in France for the purpose for which we employ lime.

The wood must be thoroughly seasoned. The proper time to fell oaks, and most other trees, is when they fail to increase in size more than two feet per annum. If cut down before that period of their existence, the heart will not be fully developed, and will not be as hard as the other part. When oaks are about thirty years old, their growth is most rapid. If wood be in an unseasoned state, it is sure to warp and twist and split. It is therefore very necessary that the natural juices of the tree be got rid of by seasoning it before use. After a tree is lopped, barked, and roughly squared, it is left some time exposed to the weather, and may be soaked in fresh running water with advantage, and hoiled or steamed. Any of these processes tend to dilute and wash out the juices, and the water readily evaporates from the wood at a subsequent period, and the color of the wood will be much improved by this means. Thin planks, if properly exposed to the air, will be seasoned in about a year, but the thicker the wood the longer the time it will take. Oak loses nearly two-fifths of its weight in proper seasoning.

DOMESTICATION OF THE BISON.—Mr. J. W. Cunningham, of Howard county, Nebraska, has a letter on the domestication of the American bison in Mr. J. A. Allen's book devoted to this animal. It appears that the bison has been crossed with the ordinary milch cow, and that half and quarter-breeds are not uncommon, and the cows yield extremely rich milk. They prove to be both hardy and tame. The color of the bison and the majority of the distinguishing characters disappear after repeated crossings. The lump of flesh covering the dorsal vertebrae also becomes diminished. The preservation of a pure breed of the bison does not seem so easy. In some instances where buffaloes have been broken to the yoke they have proved strong and serviceable; but rather unmanageable at times. Unless the breed is maintained in some way artificially, the wild species will, no doubt, before very long become extinct.

A SUCCESSFUL SUGARIE.—Notwithstanding all the accounts we hear of the miserable condition of the beet sugar industries, says the *London Farmer*, it seems that, in some instances at least, the trade is by no means a bad one. The balance sheet of the "Cujawien" sugar factory, at Amsee, now in the second year of its existence, sets forth that during the past season the company have treated 525,630 cwt. of beets, and that, after writing off 5% for depreciation of buildings, and 10% for that of machinery, laying out 96,000 marks on extensions, carrying over 40,000 marks to the reserve fund, and handsomely remunerating the directors, there still remains a net profit of 120,000 marks for division among the shareholders, at the rate of 20% upon their capital stock subscribed.

Care of Boilers and Firing.

All steam boilers should be carefully cleaned at stated times. The time a boiler will run safely without cleaning, depends on the character of the water and must be determined by the circumstances of each case. Some boilers should be cleaned every week, others may run two to four weeks. As a rule every boiler should be opened once a month, the inside carefully inspected and all deposits removed. The accumulation of deposit endangers the safety of the boilers, by preventing contact of the iron with the water; the iron becomes heated to redness, loses its strength and gives way under the pressure of steam. When we consider that a boiler of 40 inches diameter, with 80 pounds of steam, receives a strain of 10,000 pounds on each inch in the length of the boiler, we can more fully realize the importance of taking great care of all its parts. And as the pressure is often increased to 100, 125 and 150 pounds per square inch, the wonder is not that we have so many, but so few explosions. With a mass of deposit between the water and the iron, the quality of the iron is of but small moment, as, if it is heated to redness, and perhaps nearly melted, its tensile strength is destroyed, and a rupture or explosion is sure to follow.

The next important duty of the engineer is to keep a steady water-line in the boiler. All parts of the boiler exposed to the action of the fire must be covered by water. Should the water line fall so low as to expose the top of the flues or crown sheet, the over-heating of the iron is the immediate result and disaster is sure to follow. Again, with a variable water line, the pressure of steam cannot be kept uniform, the machinery is run with variable speeds, and a large amount of fuel is used. The use of a glass water gauge in connection with the water gauge is a great help to the engineer to keep a proper water line. The lower end of the glass tube should be so set that it will lose the water before the flues are exposed, and when water cannot be seen it indicates danger.

GUNS.—John Rigby, the Irish gunmaker, whose weapons were used by the foreign teams in the international contests, is not convinced that American breech-loading rifles are superior to his muzzle-loading ones. He has accordingly challenged the American makers to a contest at 1,000 yards. The challenge is accepted, and the match is to be shot in the spring. So we see it ended.

TO CLEAN TIN VESSELS.—First rub your tins with a damp cloth, then take dry flour and rub it on with your hands, and afterward take an old newspaper and rub the flour off, and the tins will shine as well as if half an hour had been spent in rubbing them with brick-dust or powder which soils the bands.

GOOD HEALTH.

About House Drainage.

The *Herald of Health* has the following in a general article on the health of country residents, from which we draw the following pertinent points: Question—If soap suds and household slops are so dangerous, why do they not always produce some form of contagious disease? Answer—The germs of disease are not always present, or if they are, they may be destroyed by the ozone and oxygen of the air, or favorable winds may drive them off, or the system may not always be in a condition to receive them. If a thistle blooms and seeds on a grass plot, the seeds are wafted off, and only a few ever find a place to grow. Change the circumstances and let it seed on a plowed field, and a majority of the seeds will find a place to grow. The germs of disease are infinitely more easily destroyed than those of the common thistle, and for this reason do not take effect except where all the conditions act favorably.

Question—In what way is the sink dangerous to health? Answer—It may be dangerous, and we should certainly see that it is kept clean. The refuse matter is generally run off into a barrel through a straight pipe. Here lies the danger; this refuse matter sometimes generates a poisonous gas, and as the heat of the room warms the pipe then the gases flow into the room. The consequence is, the pipe may become a source of disease and death. If you have diphtheria in your houses, look to your drains before you give up searching for its cause.

A GOOD RESOLUTION.—A physician who has passed his three-score years and ten writes, as follows: Well do I remember the day and the hour when I made, to me, the great discovery that I could conquer the "blues." I had suffered for a month the most intense mental pain because my business did not go to suit me. I found fault with my wife and children, and nothing suited me. Things were getting most uncomfortable for all of us. I got up one morning as usual and expected to have a bad day, when all at once the impulse seized me as if it had come from the other world, and, straightening myself up to my full height, I said to myself emphatically, "By the Eternal, these miserable feelings have got to go; not once to-day will I tolerate one of them in my mind for an instant." I kept my word, and have done so till now, and find it easy enough to keep the "blues" at bay.

FOOD AND RESPIRATION.—The *Journal of Chemistry*, learns from foreign exchanges that Dr. Speck has lately been engaged in examining the changes produced in the respiratory process by the use of fatty food, of coffee, quinine, alcohol, and water, and by the inspiration of air respectively rich in carbonic acid, poor in oxygen, and rich in oxygen. His chief conclusions are: 1. With an increased proportion of hydrogen in diet the amount of the air inspired and expired decreases. Nutrients, such as sugar, which contain little hydrogen in comparison with their oxygen, involve more exertion of the respiratory organs than such as are rich in hydrogen, like the fats. 2. The more carbon predominates in the food in proportion to hydrogen, the more air is exhaled in proportion to that inhaled. 3. The more carbon increases in the diet in proportion to hydrogen, the more carbonic acid is evolved, and the more oxygen is taken up; the richer the diet in hydrogen, the less oxygen is required. An atmosphere containing five or six per cent. of carbonic acid could be breathed for some minutes without oppression. At 11.51% great exertion was needed to breathe for one minute. At 7.2% all the carbonic acid produced in the body is retained in the blood, and 11.2% a great part of that also which is inhaled.

TAKE CARE OF YOURSELF.—Hall's *Journal of Health* gives the following good advice: A New York drayman or hack driver, considers his horse a part and parcel of himself, and the moment his animal ceases motion in cold weather, that moment he covers him with a blanket. Why this care? He knows that if neglected, the horse will take cold, and that in a day or two, he will most probably die of some form of inflammation about the lungs; yet multitudes of people perish every year, from being cooled off too quick after exercising. More people die prematurely from want of care in any given year, than perish by plague, famine, pestilence and war. The Duke of Wellington died of an over-hearty meal of venison in November. Gen. Taylor was taken from the White House to the grave, by a bowl of fruits and iced milk, on a Fourth of July. It is a good omen, that intelligent, reflecting and humane teachers in different parts of the country, are beginning to make personal health one of the branches of an elementary education. Is it not wonderful that more efficient steps have not been taken in that direction long ago.

TEA AND HOT BISCUIT.—A professor of hygiene in a young ladies' seminary writes as follows: Popular opinion associates the teapot with the middle-aged and the elderly ladies, but popular opinion would find itself mistaken, if not shocked, to see the middle-aged lady teachers refreshing and rebuilding their brains, at the day's close, with that perfection of all foods and brain-builders, a glass of milk, while they of 16 sip their cups of tea. And then the fancy for hot biscuits is something truly marvelous. There was a time when nothing else could be had for breakfast. That, of course, was a glad time for the mistaken souls that dream of finding bliss in such a way, and was a no less glad time for the pill-vendors. Now, by one of those revolutions which come to families now and then, the hot biscuit breakfast has come to be a thing of the past, and substitute the "ounce of prevention" of dyspepsia—in the form of bread which has reached its perfection by means of the chemical change secured by an interval of 24 hours between the baking and the eating.

TIPLING NURSES.—There can be no doubt that nurses' bottles may be worse for children than nursing-bottles. M. Anarion, in the *Archives de Toxicologie*, reports two cases in which children, at the breast of apparently healthy and well-to-do nurses, were suffering from convulsions, and in which the children were saved by depriving the nurses of alcoholic potations, in which they were found to be freely indulging. As the *Philadelphia Reporter* remarks, it is a pernicious delusion of nursing mothers and wet-nurses, that, when suckling infants, they required to be "kept up" by alcoholic liquors; and women who are little given to alcohol at other times become, for the nonce, determined tipplers,—this being, perhaps, of all other times that when alcohol is likely to do most harm and least good.

EGG OIL FOR WOUNDS.—Extraordinary stories, says the *Druggists' Circular*, are told of the healing properties of a new oil, which is easily made from the yolk of hens' eggs. The eggs are first boiled hard, and the yolks are then removed, crushed and placed over a fire, where they are carefully stirred until the substance is just on the point of catching fire, when the oil separates and may be poured off. One yolk will yield nearly two teaspoonfuls of oil. It is in general use among the colonists of south Russia as a means of curing cuts and bruises, etc.

TOO WHITE FLOUR.—Messrs. Mouriez & Chievre, chemists, who have superintended the provision of bread for the hospitals, and subjected all kinds to experiments, submitted a report to the French Academy, in which they condemn the practice of making bread too white. It is then, they remark, a condiment, not an aliment. The exclusion of bran is a loss of nourishment to the consumer; the palate and fancy are gratified at the expense of the whole animal economy.

OUR IGNORANCE.—S. D. Goss, M. D., says: "Of the essence of disease nothing is known."

MINING SCIENTIFIC PRESS

W. B. EWER.....SENIOR EDITOR.

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SAN FRANCISCO:
Saturday Morning, Feb. 2, 1878.

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The Week.

We have been blessed with another week of rainy weather and already the rainfall for the year foots up about 10 inches more than we had at the same time last year, thus insuring good crops and a prosperous season. Considerable damage has been done to ditches in different parts of the country by the late storm, but these are repaired as rapidly as may be and most of them are now running full. As a consequence, the hydraulic miners have plenty of water and are being repaid for their long term of enforced idleness. The people throughout the State now look forward to prosperous times once more, and although the effects will not be felt for some time to come, there are already encouraging symptoms of revival in different branches of trade. The lower part of this State in particular suffered severely during the drouth of 1877, but the abundant rainfall received so far, insures to the population there prosperous times again. The mining community throughout the State are rejoicing over the heavy rains, which are sufficient for present purposes, while in the more remote regions a good supply of snow is hanked up, which will be available when the rains cease. Last season, the storms of October and November deposited little snow on the mountains, but rather washed away what had collected. The snow fall in the mountains, which regulates our supply of water in summer, is much heavier this year than last and the snow is packed and hardened. Therefore, without a doubt, a good water season is already assured, even if no more should fall, but the probabilities are that the supply will be very materially added to before spring opens,

Pacific Coast Storms.

At a late meeting of the National Academy of Sciences, held at Columbia college, New York, Prof. Elias Loomis read a paper on the origin of storms, based upon data obtained from the United States signal service. In this paper he stated that our great storms began in the neighborhood of the Rocky mountains, and that no example is found of any considerable storm arising on the Pacific coast south of Oregon. This may be all very true, as far as the storms which visit the Eastern States are concerned, but probably Prof. Loomis would have seen fit to change his opinion in some respects, had he been in this part of the country for the past two weeks. Then again, there is some difference in the quality of storms, whether of wind or rain, or both, with a chorus of thunder and flashes of lightning to make it interesting.

The late storm which visited this State assuredly came from south of Oregon, as all our storms do. Probably the great barrier interposed by the Sierras prevents the effect of these southerly coast storms being felt to any great degree on the other side of the mountains, and such storms as are felt there from this side may come from north of the California boundary. However, as far as this State is concerned, all of our heavy storms come from the south. We occasionally have a heavy norther once in a year or so, which is unaccompanied by rain. What are called our storm winds, invariably come from the southeast or southwest, and it is these winds which are destructive to the coasting fleet. These southerly winds have prevailed to an unusual extent during the past month accompanied by heavy rains and furious squalls. The cause is explained in the able paper on the climate of California, by Mr. Redding, published in last week's PRESS.

That we do not have here the heavy storms which occur on the Atlantic side, we know very well and congratulate ourselves that this is the case. We never have any hurricanes on this coast that occasion loss of life and property on shore, nor do long continued and severe gales of wind inflict great damage to the shipping interests as on the Atlantic coast. Our southerly gales, however, are heavy on the coast and get up a very severe sea. Already this season there have been 14 wrecks, most of them within the past two weeks, and no doubt others will soon be reported. It is but proper to state, however, that most of these have occurred rather than want of good harbors on the coast-line than from severity of the gales. Few vessels are lost on this coast from stress of weather, but most of them from getting ashore in fogs, parting their moorings in roadsteads, etc.

Still the wind does blow strongly when from the southeast, or more particularly, the southwest. The latter wind is most destructive. During the last storm several pilots were carried away in vessels bound to foreign ports, because it was impossible to put them back on their pilot boats in the sea running outside the bar. One pilot boat had to lie outside the bar seven days waiting to get in. Part of the time she was laid to under bare poles, something very unusual to do, and almost impossible with any fore and aft vessel except a good pilot boat. As an illustration of how the wind blew at that time, the captain of the pilot boat referred to informed the writer that the China steamer found it impossible to make any canvas stand. She was running up the coast with the wind over the quarter, 13 knots an hour. When they set the main topsail, made of No. 1 canvas and new, it blew right out of the bolt ropes. This was on a steamer going at great speed almost before the wind, and the sail was close-reefed, and set only to steady the vessel.

For over two weeks we have had a succession of gales from the south-southeast, or southwest, all accompanied by rain. The further north we go on the coast the stronger are these southerly gales, as is also the case with the westerly summer breezes. Unfortunately the coast of California north of this point, as well as the coast of Oregon, has no harbors that are available in these gales. If vessels are inside they cannot go out, and if they are out they cannot get in. Moreover, there are not half a dozen that afford any protection whatever in gales from the southward.

The record of marine disasters on this coast is by no means so appalling as that on the Atlantic. There they have more traffic and heavier gales; but still the statement that no considerable storms arise on the Pacific coast south of Oregon, is totally erroneous. As far as this concerns the East, it is no doubt correct; but here it is different, for, as has been shown, all our heavy storms come from the south.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Northern Belle, Jan. 21st, \$3,237.72; Arizona, Jan. 21st, \$1,488.98; Alps, Jan. 24th, \$2,900.00; Christy, Jan. 23d, \$1,726.00; Christy, Jan. 25th, \$1,700.00; Tybo Con., Jan. 21st, \$8,701.31; Grand Prize, Jan. 26th, \$25,300.00; Manhattan, Jan. 22d, \$7,634.73; Christy (Utah), Jan. 28th, \$1,586.00; Tybo Con., Jan. 23d, \$8,797.10; Manhattan, Jan. 26th, \$7,273.39; Endowment, Jan. 28th, \$1,873.45; California, Jan. 26th, \$229,186.75; Con. Virginia, Jan. 26th, \$195,272.59; Alps, Jan. 30th, \$5,000; Christy, Jan. 30th, \$2,670; Tybo, Jan. 25th, \$4,324.23.

An Important Decision.

The Mining Debris Case to be Left to the State Courts.

The United States Supreme Court on Monday decided the case of the Little York Gold Mining and Water Company vs. Keyes, in error to the Circuit Court of the District of California. The question in the case is whether grants made by the United States on placer mines as such involve the right to discharge refuse earth and gravel, produced by working the mines, called tailings, into neighboring streams—in the case of Bear river—inasmuch as the mines cannot be worked except by means of such discharge of streams of water loaded with refuse; and the immediate question was upon its removal from the State to the Federal Court. It is here held that the motion to remove is not within the statute, because it does not appear upon the record as made that the suit really involves a controversy as to the construction or effect of the Federal law affirmed. The Chief Justice delivered the opinion, Mr. Justice Bradley dissenting, who holds that the case in question sufficiently indicates its Federal character.

This view of the matter throws the subject back to the State courts to decide upon, as it is held that the question is not one of a Federal character. There is little doubt, however, but that the matter will eventually come before Congress.

In the California Legislature, Senator Haymond's joint resolution, relative to public lands in this State, passed the Senate with little discussion and was favorably reported back to the Assembly by the Committee on Public Lands, to whom it was referred. This resolution bears on the question of irrigation and mining debris both. The words "and protection of agricultural lands from the effect of mining debris" were inserted by the Senate Committee.

The resolution, as it passed the Senate, is as follows:

WHEREAS, It has been the settled policy of the Government of the United States to donate to the several States the swamp and overflowed lands within their respective limits, in trust, that the proceeds of the sale thereof should be applied to rendering such lands fit for habitation and cultivation; and, whereas, a large portion of the lands in this State, unsold and belonging to the United States, cannot be inhabited and cultivated without irrigation; and, whereas, it would therefore seem to be in accordance with the policy of the Government to appropriate the proceeds of the sales of such lands to the purpose of rendering them suitable for such habitation and cultivation, thereby tending to their settlement, the encouragement of emigration and the promotion of the general welfare; therefore, be it

Resolved by the Senate and Assembly of the State of California, That the Government of the United States be and is hereby requested to donate to the State of California the proceeds of the sales of public lands heretofore made in this State, to be used by the State, under such regulations and on such trusts as may be prescribed, for the purpose of irrigation and protection of agricultural lands from the effect of mining debris; and be it further

Resolved, That the Governor is requested to transmit copies hereof to our Senators and Representatives in Congress.

The Popular Loan.

The four per cent. funded loan of the United States is being subscribed to rapidly. Subscriptions were received for the first time on the 26th ult., and on the 28th subscriptions were received to the amount of \$2,600,000. This is termed the "Popular Loan" and is intended to offer an opportunity to all classes of people to take United States bonds in small amounts, which will give them better security for their money than they get in ordinary investments or ordinary savings banks. The Government pledges its faith to pay the interest and redeem the bonds and although the interest is low, the money is perfectly safe.

The bonds are redeemable July 1st, 1907, and bear interest, payable quarterly, on the first day of January, April, July and October of each year, and are exempt from the payment of taxes or duties to the United States, as well as taxation in any form or under State, municipal or local authority.

The subscriptions may be made for coupon bonds of \$50, \$100, \$500, \$1,000, and for registered bonds of \$50, \$100, \$500, \$1,000 \$5,000 and \$10,000.

Two per cent. of the purchase money must accompany the subscription; the remainder may be paid at the pleasure of the purchaser, either at time of subscription or within 30 days thereafter, with interest on the amount of the subscription, at the rate of 4% per annum to date of payment.

Upon the receipt of full payment, the bonds will be transmitted free of charge to the subscribers, and a commission of one-fourth of one per cent. will be allowed upon the amount of subscriptions, but no commission will be paid upon any subscription less than \$1,000.

Forms of application will be furnished by the Treasurer at Washington, the Assistant Treasurers at Baltimore, Boston, Chicago, Cincinnati, New Orleans, New York, Philadelphia, St. Louis and San Francisco, and by the National Banks and bankers generally. The applications must specify the amount and denominations required, and for registered bonds, the full name and postoffice address of the person to whom the bonds shall be made payable.

The interest on the registered bonds will be paid by check issued by the Treasurer of the United States, to the order of the holder, and mailed to his address. The check is payable on

presentation, properly endorsed, at the offices of the Treasurer and Assistant Treasurers of the United States.

Payments for the bonds may be made in coin to the Treasurer of the United States at Washington, or Assistant Treasurers at Baltimore, Boston, Chicago, Cincinnati, New Orleans, New York, Philadelphia, St. Louis and San Francisco.

To promote the convenience of subscribers, the Department will also receive, in lieu of coin, called bonds of the United States, coupons past due or maturing within 30 days, or gold certificates issued under the act of March 3d, 1863, and national banks will be designated as depositories under the provisions of section 3,153, Revised Statutes of the United States, to receive deposits on account of this loan, under regulations to be hereinafter prescribed.

The issuance of these bonds will give an opportunity for any man with savings to invest to put them where they will be perfectly safe, require no attention and bring interest promptly. High rates of interest, as a general thing, mean comparatively poor security, and low rates good security. Although to us on this coast 4% per annum seems ridiculously small, where we have been accustomed to hear of 1% per month as a regular thing, there is no doubt that this popular loan will meet with ready acceptance among all classes of the community.

The Business Depression.

While we are having hard times in the United States, they are having harder times elsewhere. Of course in the countries engaged in warfare great distress prevails, but in other parts of the world where peace prevails the industrial situation is by no means bright. In England the coal and iron workers, a very large proportion of the laboring population, are by no means well off. In Northumberland the collieries have accepted a reduction of wages, and throughout the district of the northern board of arbitration the iron workers' wages will probably be still further reduced. The textile trades are generally depressed, and at Rochdale some hills are on short time. In the forest of Dean and South Wales great distress still prevails, and measures have had to be taken for its relief. At Sheffield a large number of puddlers and shinglers have received notice of a reduction, and under present circumstances it is likely to be accepted. In the building trades several important strikes still continue, and labor is continually coming and going on the work affected. At Stafford the boot and shoe trade is especially slack, and at Birmingham many of the staple industries are but indifferently employed.

It will be seen from this that in England they are having hard times as well as we are here, and that the depression in trade is by no means confined to one locality, or due to local causes alone. It must be remembered, moreover, that although the greatest distress comes upon the laboring community, the numerous and increasing failures all over the country show that employers have suffered as well. Many establishments which have heretofore been doing a good business and had a good standing have succumbed to the depression of 1877, and probably more will have to go before a business revival is effected. Among us in this State the prospects for more general activity and better times are gratifying indeed. We have been blessed with abundant rains, insuring good crops and a good water season for the mines for this year, and the people are beginning to recognize the fact that they have been living too much on a speculative basis. The experience of the past year will teach many the necessity of exercising more economy in the future, and the result will be beneficial to the community. We have not on this coast entirely gotten rid of our fast modes of living, prevalent in early days, when money was so plentiful, but as the new generation comes to the front with, we hope, better legitimate business ideas, and less speculative tendencies, we shall continue to improve.

Postal Delinquencies.

MESSES. DEWEY & CO.—Gentlemen:—Since my paper (the MINING AND SCIENTIFIC PRESS) has been directed to this office, I have not received more than one number per month. The office is in J. W. McWilliams' store, and all the townsfolks are allowed to walk in the little apartment at pleasure and select that which best pleases them, and those at a distance must content themselves with such parts of their mail as the others do not choose to take. Noticing to-day the appointment of a special agent of the Post-office Department in your city, that placing the remedy within easy reach of you and alone prevents me from writing to the Department at Washington. I am not the only sufferer, but have not time now to write more on the subject, hoping you will feel sufficient interest to attend to the matter yourselves.

Yours respectfully,
G. H. MOORE.

Battle Mountain, Lander Co., Nev., Dec. 23d, 1877.

[We publish the above for the benefit of all whom it may concern. It is the first and only complaint we have heard from that quarter. As it is for the interest of every post-master to do the best he can to give satisfaction, we trust that Mr. Moore will have no further cause to complain. We pay Uncle Sam his own price for postage on papers sent from our office, and he ought to pay his post-masters enough to deliver them properly.—ENS. PRESS.]

THE creeks and gulches all over the country have been booming this week, and in the mining counties any amount of "slickens" have been washed down.

An Eastern Idea of Lead and Silver.

The most ridiculous story which has come over the wires for a long time is contained in the following dispatch from New York on Monday, purporting to be a *Tribune* Washington special:

It is reported on good authority that the sum of \$300,000 has been raised by those interested in silver mining on the Pacific coast to assist in mobbing public opinion in favor of the remonetization of the "dollar of our fathers." This sum, it is said, is being used judiciously in those sections of the country where the sentiment of the people is strongly against silver inflation. In the East, bright and active young lawyers who have some influence in their respective localities, are said to have been hired at from \$1,000 to \$2,000 each, to write or speak in favor of silver, and so turn the tide in its favor. In the meantime the owners of silver mines are said to be carefully running their drifts and adits on half-force and time, to avoid the glut of silver in the market, and thus keep up its price as much as possible, until the fate of the Bland silver bill is decided. The recent discoveries of chemists and metallurgists in the science of cupellation has been so important that some of them claim that they can even melt up sheet lead and piping in ordinary use, and extract a sufficient percentage of silver to make the operation largely profitable, and arrangements have been already made to reopen the workings of many abandoned mines of poor ores under new cupellating processes, if the bill should pass.

If reading that paragraph will not make some of our silver mining friends smile we do not know what will. New cupellating processes for silver ores is good. No doubt there are several new processes, as plenty of them are always floating about the country, but we haven't heard of any since the Fryer that started up any new mines on its account, and we all remember the result of that. But we have not heard of any people with silver mines running their "drifts and adits" on half force and time to avoid a glut of silver, though some may be doing it for fear of not getting any more.

These chemists and metallurgists who have discovered such wonderful new things in the science of cupellation ought to keep their secrets to themselves and set up a junk shop to buy up all the lead pipe and sheet lead in the country, otherwise our refiners might get ahead of them before that pipe went on the market. They pay our refiners a very poor compliment when they think they can get silver enough out of lead pipe to make the operation profitable. Of course you can get silver out of lead pipe, for you do not find much lead not associated with silver, and it does not pay to work it so very close as to get out every atom; but the public may rest assured that when the base metal is refined and the lead and silver separated, as it of course always is, the refiners do not leave any more silver in the lead than they can help. As a general thing the less the Eastern people say or write about mining or metallurgical matters the less chance there is to expose their ignorance, and while such paragraphs as the one above quoted may serve a purpose on the other side of the Rocky mountains, they only provoke a smile out here.

Periodicity of Rainfall and Its Probabilities.

Again Prof. Becker, of the State University, favors our readers with graphic reports of his studies concerning the rainfall of this coast. We make the engravings from drawings furnished by him, and they and the descriptions of their teachings contained in the letter which we print below, are worthy of careful study. As he says in his letter, his deduction made last December was that we should have 20 inches of rain in San Francisco this year, and the verification of this prediction is certainly well-nigh realized. Let this fact lead all to follow the Professor in his researches. He writes:

EDITORS PRESS:—By referring to the records of the rainfall for San Francisco, or to the diagram published on the ninth page of your present volume, you will perceive indications of what seems to be a 13-year periodicity, there being decided minima in the seasons of 1850-51, 1863-64 and 1876-77. It struck me that these indications might be tested by representing the rainfall graphically in such a way that the curve would return upon itself at the end of the period. If, then, the curve for the second period were superimposed upon the first, a similarity in the fundamental laws governing each would at once manifest itself to the eye. The experiment succeeded beyond my expectations, so much so, that when I showed my results to Prof. Davidson, he pronounced them of decided local importance, as well as of general interest, and advised that they should be published on this coast. I have prepared diagrams on a large scale for him, which he exhibited at the Academy of Science.

Further to test the apparent law, I discussed the Sacramento and Stockton rainfall in the same way, and obtained results which prove at least that at these places (taken for want of

data from more distant stations, to represent the Sacramento and San Joaquin valleys) the rainfall is governed by the same laws controlling the precipitation on the coast at San Francisco.

I send you with this note a diagram, in which, for comparison, the observations of the three places are plotted in the ordinary way on rec-

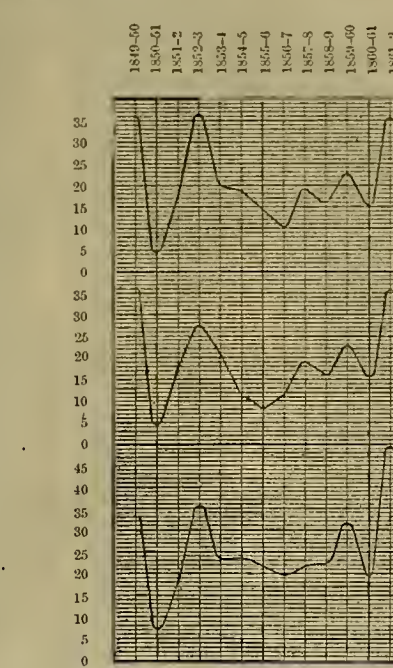


Diagram Showing Comparative Rainfall at San Francisco, Sacramento and Stockton.

tangular co-ordinates, and on the same scale. A second plate exhibits the periodicity and the probabilities as derived from past observations. The latter needs a word of explanation. From the center of each diagram diverge at equal angles 13 radii. Each represents one rainy season of the 13-year period, the distance from the center at which the curve crosses each radius

the rainfall for each year, and the positions of the latter in the period.

It will be observed that these curves are either nearly coincident or cross each other at short intervals: good evidence that they are vibrations from a common mean, or a fundamental law.

In order to advance toward an empirical de-

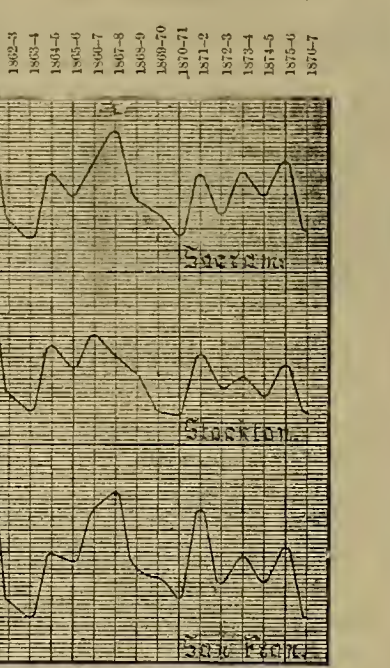


Diagram of Periodicity and Probability.

termination of this law, I drew a curve through the points representing the mean of the rainfall for each corresponding pair of years—say 1852-3 and 1865-6—and also through the intersections of the curves. The figure thus obtained is shown on the diagram as a full black line. The mean curve thus obtained still showed evidences of a vibratory character, which I

The measurements of the probability curve I give with the tables of figures, as follows:

Sacramento.				
YEAR.	RAIN-FALL.	YEAR.	RAIN-FALL.	POSITION PROBABILITY PERIOD, BLIT'S
1850-51....	4.71	1863-64....	7.87	I 9.20
1851-52....	17.98	1864-65....	22.61	II 18.75
1852-53....	30.37	1865-66....	17.92	III 25.30
1853-54....	20.07	1866-67....	25.31	IV 25.60
1854-55....	18.02	1867-68....	32.77	V 22.60
1855-56....	18.77	1868-69....	16.64	VI 18.00
1856-57....	10.44	1869-70....	13.57	VII 14.30
1857-58....	18.09	1870-71....	8.47	VIII 17.70
1858-59....	16.04	1871-72....	22.40	IX 19.20
1859-60....	22.63	1872-73....	18.60	X 20.30
1860-61....	15.55	1873-74....	23.00	XI 24.00
1861-62....	35.55	1874-75....	17.80	XII 18.20
1862-63....	11.58	1875-76....	25.69	XIII 18.20
Totals....	242.30		247.36	244.45
1840-50....	30.00	1876-77....	9.23	

*The figures from this point on are derived from railroad data, furnished me by Prof. Davidson. The only difference of any consequence between these and those published by the SCIENTIFIC PRESS is for 1874-75.

Stockton.				
YEAR.	RAIN-FALL.	YEAR.	RAIN-FALL.	POSITION PROBABILITY PERIOD, BLIT'S
1850-51....	4.71	1863-64....	7.50	I 8.50
1851-52....	17.98	1864-65....	22.51	II 18.70
1852-53....	27.40	1865-66....	17.92	III 23.50
1853-54....	21.04	1866-67....	25.31	IV 22.70
1854-55....	11.68	1867-68....	20.71	V 17.10
1855-56....	8.37	1868-69....	16.35	VI 13.00
1856-57....	11.38	1869-70....	7.43	VII 12.00
1857-58....	18.09	1870-71....	0.73	VIII 13.50
1858-59....	16.04	1871-72....	20.30	IX 10.00
1859-60....	22.72	1872-73....	13.50	X 18.00
1860-61....	15.55	1873-74....	15.20	XI 19.00
1861-62....	35.55	1874-75....	11.14	XII 18.80
1862-63....	11.58	1875-76....	18.33	XIII 14.00
Totals....	222.99		203.79	210.40
1840-50....	36.00	1876-77....	7.03	

San Francisco.				
YEAR.	RAIN-FALL.	YEAR.	RAIN-FALL.	POSITION PROBABILITY PERIOD, BLIT'S
1850-51....	7.40	1863-64....	10.08	I 11.50
1851-52....	13.44	1864-65....	24.73	II 20.60
1852-53....	35.26	1865-66....	22.93	III 27.40
1853-54....	23.87	1866-67....	34.92	IV 30.50
1854-55....	23.68	1867-68....	38.54	V 28.30
1855-56....	21.60	1868-69....	21.35	VI 23.30
1856-57....	19.81	1869-70....	19.31	VII 19.30
1857-58....	21.88	1870-71....	14.10	VIII 19.40
1858-59....	22.22	1871-72....	34.71	IX 25.00
1859-60....	31.22	1872-73....	18.02	X 28.20
1860-61....	19.72	1873-74....	23.98	XI 28.50
1861-62....	49.27	1874-75....	18.40	XII 28.60
1862-63....	18.62	1875-76....	26.01	XIII 19.00
Totals....	308.05		307.38	300.60
1840-50....	33.10	1876-77....	10.00	

I may mention that they indicate 20.50 inches for San Francisco for the second year of the period, which is the current season. While I do not care to hazard any prediction, I point to this as a hopeful fact, which now seems more likely to find confirmation in the rain-gauges than it did when I first made it out, late in December.

As a further evidence of the 13-year periodicity, I may point to the total amounts of rain which have fallen during each period. It will be seen that in San Francisco the precipitation in the two periods is so close as to be far within the necessary errors of even Mr. Tennent's observations. In Sacramento and Stockton they come quite close. The variations, moreover, are in opposite directions at the two places, though the difference at Sacramento is much greater than at Stockton. I also give the sum of the probability curve indications, which, it will be seen, come very close to the mean of the observations, a fact which appears to show that it is constructed on rational principles.

If, then, I have not been led astray by accidental coincidence, we shall be blessed with abundant rains for four or five seasons to come. But of course it must not be forgotten that the data discussed are too few, both as time and geographical distribution, for any very reliable generalizations.

Observations before 1849 do not, I believe, exist. Observations at more widely separated points do, but I have not been able to obtain them in a suitable form. The "Smithsonian Contribution" No. 222, contains many data as to the rainfall in California, but unfortunately the precipitation is given in calendar years, instead of by seasons; nor does the memoir afford any means of separating the seasons. I have written to Washington to request data from which to ascertain whether or no the same laws prevail throughout the Pacific States; and shall be much obliged to any of your readers who may have data extending over a considerable number of years, and who may feel sufficient interest in this discussion, to transmit them to me.

G. F. BECKER.
University of California, Berkeley, Jan. 21st.

MINING ACCIDENT.—A severe accident occurred at Truckee Flat on Tuesday last, resulting in the death of two miners named Simon Shay, aged about 48 years, and Thomas Bowen, aged about 30. The men, with ten or a dozen others, were working below a large reservoir, which gave way, precipitating its body of water suddenly upon the workmen. All escaped but the two unfortunates named above, who were carried by the rush of water nearly three quarters of a mile through the Pittsburg and Yuba River Mining Company's flume. When found, Shay was dead and Bowen survived but a few hours. Both leave families.

A PETITION has been filed at the Clerk's desk in the House on behalf of McGarrahan in the New Idria mining case. McGarrahan asks legislation from Congress to correct the record. The case was referred to the Committee on Lands, and is likely to attract a good deal of attention before it is concluded.

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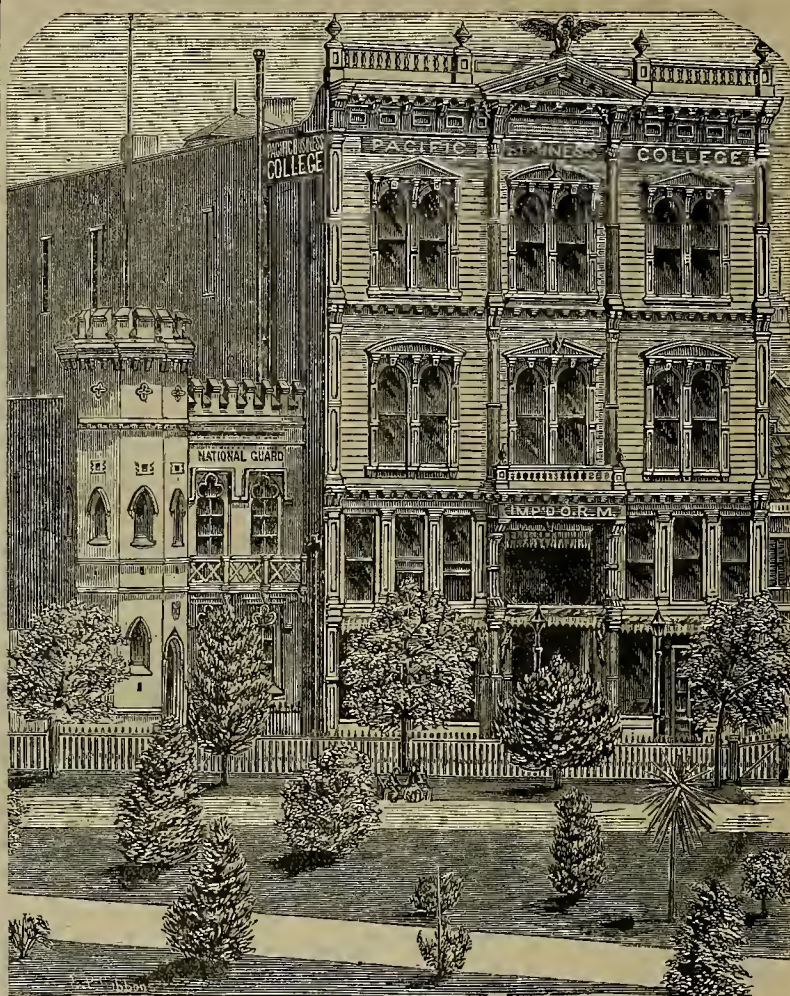
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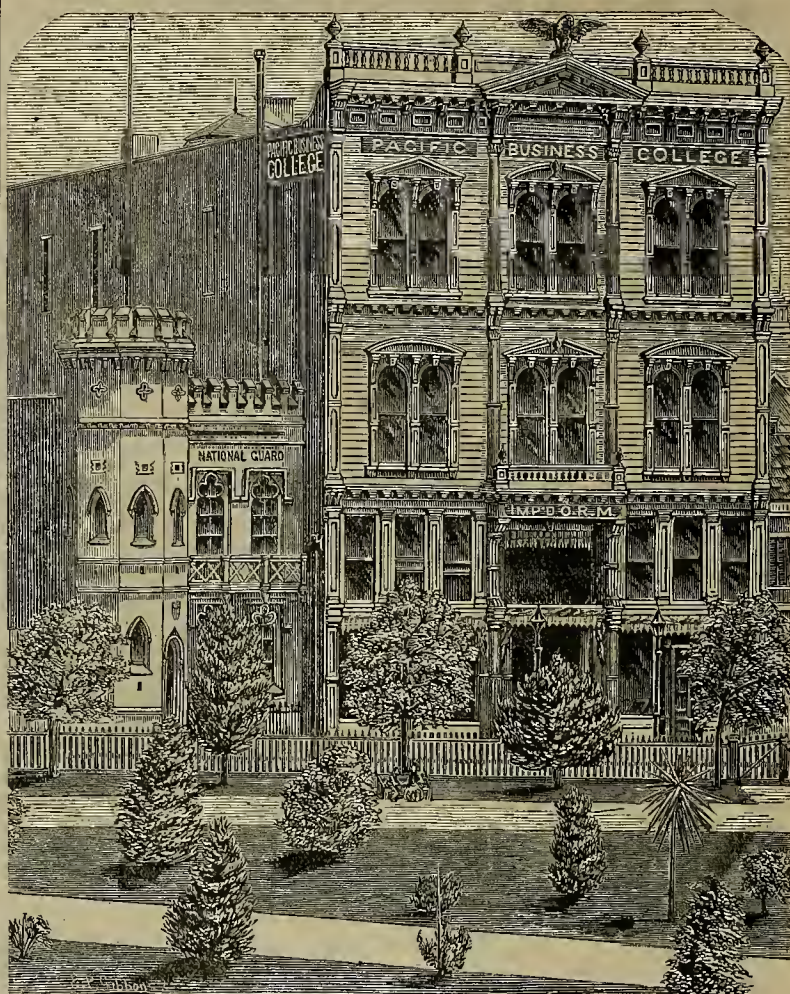
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Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Jan. 10.	Week Ending Jan. 17.	Week Ending Jan. 24.	Week Ending Jan. 31.
Alpha.	131	124	103	11
Alta.	283	108	72	94
Andes.	1.05	1.05	1.05	60c
Alps.	1.47	65	5	51
Argenta.	12	1.40	1.30	1.40
Baltimore Con.	1	1	1	1
Belcher.	54	4	75c	60c
Belmont.	204	19	13	174
Best & Belcher.	204	19	13	174
Bullion.	61	5	4.40	60
Bechtel.	10	10	10	9
Bodie.	1.70	1.20	1.10	1.10
Bonanza.	3.70	3.45	3.40	3.40
Caledonia.	4.05	3.40	3.30	3.40
California.	294	283	273	261
Challenge.	1.25	1.25	1.25	1.25
Chollar-Potosi.	371	343	354	354
Confidence.	1.00	1.00	1.00	1.00
Con Imperial.	1.00	1.00	1.00	1.00
Con Virginia.	26	24	24	224
Crown Point.	7	6	4.40	51
Dayton.	80c	85c	65c	65c
Deer Creek.	80c	85c	65c	65c
Day.	21	21	2.60	2.11
Eureka Con.	38	37	363	351
Excelsior.	44	3.65	3.40	3.40
Gen Thomas.	40	35c	40	35c
Grand Prize.	15	13	12	131
Gila.	1.40	1.40	1.40	1.40
Golden Gate.	1.40	1.40	1.40	1.40
Gould & Curry.	9	8	6	4
Hale & Norcross.	25c	20c	20c	20c
Hussey.	25c	20c	20c	20c
Julia.	2	1	1	1
Justice.	17	11	11	11
Kentuck.	3	3	3	3
K. K. Con.	3	3	3	3
Lady Wash.	11	10	9	8
Leopold.	1.10	1	1	1
Leviathan.	40c	35c	40c	35c
Madison.	2.30	2.10	2	2
Manhattan.	11	11	10	11
Meadow Valley.	30c	25c	20c	20c
Mexican.	15c	14c	14c	14c
North Con Virginia.	1.20	1.20	1.20	1.20
New York.	1.10	1.10	1.10	1.10
Northern Belle.	1.10	1.10	1.10	1.10
New Coso.	60c	60c	60c	60c
Navajo.	85c	80c	75c	65c
Occidental.	11	11	11	11
Ophir.	55	52	51	51
Overman.	224	201	17	174
Panther.	1	1	1	1
Raymond & Ely.	25c	20c	15c	10c
Rock Island.	11	10	9	8
Sage.	11	10	9	8
Seg Belcher.	35	35	32	32
Sierra Nevada.	54	4.55	4.30	4.40
Sierra Hill.	3	3	2.80	2.80
Succor.	3	3	3	3
Star.	6	5	5	5
St. Louis.	1	1	1	1
Trojan.	65c	60c	55c	45c
Union Con.	161	152	142	142
Utah.	15c	10c	10c	10c
Wells Fargo.	15c	10c	10c	10c
Woodville.	1.15	70c	1	70c
Yellow Jacket.	114	91	104	81

Sales at S. F. Stock Exchange.

Friday A. M. Jan. 25.	Silver Hill.	2.80
80 Alpha.	220	114
2280 Alta.	35	Union Con.
155 Andes.	100	Yellow Jacket.
100 Belcher.	100	Yellow Jacket.
750 Bullion.	700	60
600 Benton.	1.40	45c
45 Chollar.	32	145
55 California.	27	100
950 Con Virginia.	25	100
1510 Crown Point.	55	100
450 Con Imperial.	80	75c
450 Caledonia.	3.20	45c
300 Con Wash.	45c	45c
300 Challenge.	100	100
185 Excelsior.	3.40	35c
170 Gould & Curry.	8.40	35c
45 Hale & Nor.	3.40	745
250 Justice.	2.20	745
550 Julia.	11	11
15 Jose Scates.	40c	675
40 Kentuck.	44c	702
900 Kossuth.	20	170
200 Leviathan.	30	300
200 Morning Star.	85c	10
95 Mexican.	14	10
1300 Monumental.	10c	300
55 New York.	51	50
370 Ophir.	51	50
125 Overman.	18	300
20 Occidental.	1	100
900 Rock Island.	10c	20
245 Savage.	2.40	100
530 Sierra Nevada.	4.50	4.50
550 Senator.	3.30	1075
30 St. Louis.	25c	670
200 Solid Silver.	3	650
100 South Con.	150	150
200 Silver Hill.	2.80	2.80
340 Trojan.	45c	45c
410 Union Con.	150	150
20 Utah.	13	13
1550 Wells Fargo.	150	150
200 Woodville.	55c	55c
100 Ward.	35c	35c
100 Yellow Jacket.	91	91
550 Alta.	91	91
635 Argenta.	1.30	1.30
40 Alpha.	100	100
160 Bodie.	100	100
30 Best & Belcher.	18	18
110 Belcher.	54	54
100 Belle Isle.	150	150
150 Belmont.	50	50
245 Con Virginia.	22	22
55 California.	267	267
10 Chollar.	31	31
1230 Crown Point.	51	51
370 Con Imperial.	75c	75c
1380 Day.	12	12
20 DeFrees.	55c	55c
550 Endowment.	70c	70c
840 El Dorado S.	30	30
210 Falcou.	13	13
970 Grand Prize.	13	13
20 Gen Thomas.	30c	30c
20 Gould & Curry.	30c	30c
550 Gila.	30c	30c
50 Golden Chariot.	1.05	1.05
50 Hale & Nor.	1.05	1.05
100 Horset.	20c	20c
150 Hussey.	150	150
1650 Independent.	60c	60c
245 Justice.	10	10
120 Leopold.	90c	90c
300 New York.	110	110
300 New York.	110	110
210 Northern Belle.	10	10
100 New Coso.	50c	50c
150 Navajo.	70c	70c
170 Ophir.	18	18
50 Overman.	18	18
700 Pleades.	14	14
400 Panther.	40c	40c
240 Raymond & Ely.	30c	30c
30 Star.	30	30
100 Savings.	11	11
550 Silver Hill.	35	35

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ. NT. SALE.	SECRETARY.	PLACE OF BUSINESS.
Belcher M Co	Washoe	12	1 00	Dec 17	Jan 19	Feb 7
Bullion M Co	Washoe	6	1 00	Jan 22	Feb 25	March 13
Chollar-Potosi M Co	Washoe	14	3 00	Jan 7	Feb 12	March 5
Excelsior M Co	Washoe	12	1 00	Jan 17	Feb 20	March 11
El Dorado South Con M Co	Washoe	11	50	Jan 29	Mar 8	March 29
Gen Lee M Co	Arizona	1	5	Dec 3	Feb 18	March 25
Gould & Curry M Co	Washoe	32	1 00	Dec 17	Jan 23	Feb 13
Hale & Norcross M Co	Washoe	57	1 00	Dec 13	Jan 17	Feb 7
Julia Con M Co	Washoe	5	75	Jan 3	Feb 7	Feb 28
Justice M Co	Washoe	23	2 00	Jan 13	Feb 14	March 6
Leviathan M Co	Nev	6	25	Jan 13	Feb 20	March 18
Modoc Con M Co	Cal	4	50	Jan 21	Feb 23	March 13
Mint G M Co	Washoe	20	10	Jan 3	Feb 7	March 1
Navajo M Co	Nev	3	40	Jan 2	Feb 11	March 5
Ophir M Co	Washoe	30	1 50	Jan 13	Feb 18	March 15
Rock Island M Co	Washoe	13	20	Jan 9	Feb 12	March 5
Sierra Nevada S M Co	Washoe	52	50	Jan 3	Feb 7	Feb 25
Savage M Co	Washoe	22	1 00	Jan 23	Mar 1	March 21
Trojan M Co	Washoe	6	1 00	Dec 27	Jan 28	Feb 18
Yellow Jacket M Co	Washoe	23	2 00	Jan 2	Feb 11	March 5
Woodville Con M Co	Washoe	6	25	Jan 23	Feb 25	March 23
Alpine M Co	Washoe	2	10	Jan 26	Feb 28	March 18
Argenta M Co	Nev	2	15	Dec 11	Jan 21	Feb 11
Bulwer M Co	Cal	1	50	Dec 13	Jan 18	Feb 11
Deer Creek M Co	Nev	2	3	Dec 15	Jan 31	March 2
Durges M & W Co	Arizona	9	60	Jan 4	Feb 8	Feb 28
Equitable Tunnel & M Co	Utah	16	10	Dec 19	Jan 24	Feb 13
El Dorado Slate Co	Cal	3	30	Jan 2	Feb 3	Feb 18
Eagle S M Co	Nev	7	50	Jan 18	Feb 23	March 18
Enterprise M Co	Cal	16	10	Jan 21	Mar 2	March 27
Grey Eagle M Co	Cherry Creek	1	5	Jan 10	Feb 10	March 10
Gold Bar Gravel M Co	Cal	2	50	Jan 16	Feb 18	March 11
Gold Hill M Co	Cal	1	25	Jan 5	Feb 11	March 2
Hayward Con M Co	Washoe	2	25	Dec 15	Jan 17	Feb 7
Henrick Con M Co	Cal	1	25	Dec 15	Jan 17	Feb 7
Lucky Jack M Co	Cal	1	5	Dec 6	Jan 12	Feb 5
Mariposa Land and M Co	Cal	13	100	Jan 7	Feb 11	March 12
New Coso M Co	Cal	7	50	Jan 4	Feb 11	March 6
Navajo Gravel M Co	Cal	1	5	Jan 17	Feb 19	March 8
New Grand Ditch M Co	Nev	1	10	Jan 23	Feb 20	March 13
Rock Creek M Co	Nev	1	10	Jan 16	Feb 20	March 13
Summit M Co	Cal	1	5	Dec 10	Jan 21	Feb 26
Sutro M Co	Washoe	3	2	Dec 22	Jan 30	Feb 20
Silver M Co	Nev	1	10	Jan 3	Feb 3	March 1
South Overman Con M Co	Washoe	2	25	Dec 26	Feb 2	March 25
Standard M Co	Bodie District	1	10	Jan 11	Feb 19	March 13
Young America M Co	Tuscarora	8	15	Jan 24	Feb 26	March 19

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ. NT. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpine M Co	Washoe	2	10	Jan 26	Feb 28	March 18
Argenta M Co	Nev	2	15	Dec 11	Jan 21	Feb 11
Bulwer M Co	Cal	1	50	Dec 13	Jan 18	Feb 11
Deer Creek M Co	Nev	2	3	Dec 15	Jan 31	March 2
Durges M & W Co	Arizona	9	60	Jan 4	Feb 8	Feb 28
Equitable Tunnel & M Co	Utah	16	10	Dec 19	Jan 24	Feb 13
El Dorado Slate Co	Cal	3	30	Jan 2	Feb 3	Feb 18
Eagle S M Co	Nev	7	50	Jan 18	Feb 23	March 18
Enterprise M Co	Cal	16	10	Jan 21	Mar 2	March 27
Grey Eagle M Co	Cherry Creek	1	5	Jan 10	Feb 10	March 10
Gold Bar Gravel M Co	Cal	2	50	Jan 16	Feb 18	March 11
Gold Hill M Co	Cal	1	25	Jan 5	Feb 11	March 2
Hayward Con M Co	Washoe	2	25	Dec 15	Jan 17	Feb 7
Henrick Con M Co	Cal	1	25	Dec 15	Jan 17	Feb 7
Lucky Jack M Co	Cal	1	5	Dec 6	Jan 12	Feb 5
Mariposa Land and M Co	Cal	13	100	Jan 7	Feb 11	March 12
New Coso M Co	Cal	7	50	Jan 4	Feb 11	March 6
Navajo Gravel M Co	Cal	1	5	Jan 17	Feb 19	March 8
New Grand Ditch M Co	Nev	1	10	Jan 23	Feb 20	March 13
Rock Creek M Co	Nev	1	10	Jan 16	Feb 20	March 13
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Sutro M Co	Washoe	3	2	Dec 22	Jan 30	Feb 20
Silver M Co	Nev	1	10	Jan 3	Feb 3	March 1
South Overman Con M Co	Washoe	2	25	Dec 26	Feb 2	March 25
Standard M Co	Bodie District	1	10	Jan 11	Feb 19	March 13
Young America M Co	Tuscarora	8	15	Jan 24	Feb 26	March 19

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Cuervo M Co	Cal	W. Easton	419 California	Special	Feb 2
Cherokee Flat Blue Gravel Co	Cal	W. Easton	402 Montgomery	Annual	Feb 2
Port Yuma M Co	Cal	W. Bogen	319 Clay	Annual	March 2
Manhattan M Co	Nev	J. Crockett	419 California	Annual	Feb 6
Metallic M Co	Nev	W. Williams	309 Montgomery	Annual	Feb 4
Mansfield M Co	Cal	J. M. Buffington	309 California	Annual	Feb 12
New Standard M Co	Cal	R. W. Thomas	419 California	Annual	Feb 16
North Con Virginia M Co	Arizona	J. Maguire	419 California	Annual	Feb 16
Northern King M Co	Arizona	J. W. Morgan	318 Pine	Annual	Feb 13
Prospect G & S M Co	Washoe	J. P. Moore	320 Sansome	Annual	Feb 12
Sulphur Bank Q M Co	Nev	L. H. Allen, Jr	320 Sansome	Annual	Feb 4
Union Flag M Co	Nev	H. Allen, Jr	419 California	Annual	Feb 13

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Cuervo M Co	Cal	W. Easton	419 California	Special	Feb 2
Cherokee Flat Blue Gravel Co	Cal	W. Easton	402 Montgomery	Annual	Feb 2
Port Yuma M Co	Cal	W. Bogen	319 Clay	Annual	March 2
Manhattan M Co	Nev	J. Crockett	419 California	Annual	Feb 6
Metallic M Co	Nev	W. Williams	309 Montgomery	Annual	Feb 4
Mansfield M Co	Cal	J. M. Buffington	309 California	Annual	Feb 12
New Standard M Co	Cal	R. W. Thomas	419 California	Annual	Feb 16
North Con Virginia M Co	Arizona	J. Maguire	419 California	Annual	Feb 16
Northern King M Co	Arizona	J. W. Morgan	318 Pine	Annual	Feb 13
Prospect G & S M Co	Washoe	J. P. Moore	320 Sansome	Annual	Feb 12
Sulphur Bank Q M Co	Nev	L. H. Allen, Jr	320 Sansome	Annual	Feb 4
Union Flag M Co	Nev	H. Allen, Jr	419 California	Annual	Feb 13

LATEST DIVIDENDS—WITHIN THREE MONTHS.

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Iron and Machine Works.

THOS. PENDERGAST.

HENRY S. SMITH

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IRON CASTINGS

and MACHINERY

OF ALL KINDS.

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SAN FRANCISCO.

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Risdon Iron and Locomotive Works

Corner Howard and Beale Streets,

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Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

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Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

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Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK. Repairing promptly attended to at the lowest possible terms.

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Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

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Flouring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

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SAN FRANCISCO, CAL.

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J. H. WEED.

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THORNTON THOMPSON.

THOMPSON BROTHERS, EUREKA FOUNDRY,

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Hoisting Engines,

For Mining and Other Purposes.

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Phoenix Iron Works,

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AND ALL KINDS OF

HOUSE, SMITH AND BRIDGE WORK.

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Experimental and Fine Special Machinery, Planing and Gear Cutting, Printing Press, Band Instrument and General Machine Repairing; Dies, Taps, Punches, Reamers and other Tools made to order. Models and Patterns for Inventors promptly executed in Wood or Metals. 514 Commercial Street, between Sansome and Leidesdorff, (Third Floor), San Francisco, Cal.

I. A. HEALD, Proprietor.

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Keating's Sack Printing Presses,

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And General Machinists.

Buy the Best.

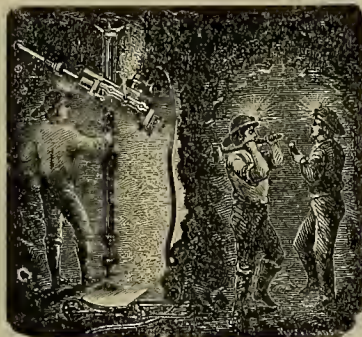
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50 BEST Mixed Cards, with name, in case, 13c., or 25 uo two alike, 10c. Outfit 10c. Dewd & Co., Bristol, Ct.

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Mines Using these Drills on the Comstock Lode—Virginia City, Nevada:

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Utah M. Co.,
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Mexican M. Co.,
Overman M. Co.,
Bullion M. Co.,
Con. Imperial M. Co.,
Gould & Curry M. Co.,
Best & Belcher M. Co.,
Crown Point M. Co.,
Belcher M. Co.,
Yellow Jacket M. Co.,
Sierra Nevada M. Co.,
Prospect M. Co.,
Baltimore Con. M. Co.,
Silver Hill M. Co.,
Dayton M. Co.,
Sutro Tunnel Co.

J. B. REYNOLDS,
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THE O'HARRA CHLORIDIZING FURNACE.

The cost of Roasting and Chloridizing is as follows:
One man, per day.....\$ 3 50
One man, per day.....3 00
Wood, 15 cords at \$3.....7 00

Cost of 20 tons.....\$13 50
Cost of one ton.....07 1/2

From 25 to 5 per cent. of salt is necessary.
In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

Several furnaces are in successful operation in California, Nevada and Idaho.

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JUDGE WM. WEBSTER, Paymaster Mine, Reno, Nev.
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J. S. COKE, Vice-President Tehama County Bank, Red Bluff, Cal.

R. H. CAMPBELL, Superintendent Afterthought Mine, Redding; Shasta County, Cal.

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Nine by Fifteen Inch Second Hand Varney Rock Breaker. Address "ENGINEER," Box 2361, San Francisco, Cal.

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Nevada Metallurgical Works,

No. 23 STEVENSON STREET,
Near First and Market Streets.

Ores worked by any process.

Ores sampled.

ASSAYING in all its branches.

Analysis of Ores, Minerals, Waters, etc.

WORKING TESTS MADE.

Plans furnished for the most suitable process for working Ores.

Special attention paid to Examinations of Mines; plans and reports furnished.

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Deposits of bullion received, melted into bars, and returned made in from 24 to 48 hours.

Bullion can be forwarded to this Office from any part of the interior by Express, and returns made in the same manner.

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Descriptive circulars, blanks for measurements, with instructions and price list free on application.

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For a small amount, in several claims on one of the

RICHEST LEDGES IN ARIZONA.

Money needed for development. The ore will pay a handsome margin to ship to the city. Apply at this office.

San Francisco Cordage Company.

Established 1856.

We have just added a large amount of new machinery of the latest and most improved kind, and are again prepared to fill orders for Ropes of any special lengths and sizes. Constantly on hand a large stock of Manila Rope, all sizes: Tarred Manila Rope; Hay Rope; Whale Line, etc., etc.

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Rock Drills, Air Compressors—Burleigh's.

Machinists' Tools—Putnam's. Compound Steam Pumps—Walker's. Plunger Pumps—Cope & Maxwell. Bucket Plunge Pumps—Valley Machine Co. Centrifugal Pumps—Heald & Cisco's. Vertical Steam Engines, Hoisting Engines—Haskin's. Chemical Engines, Hook and Ladder Trucks, Fire Extinguishers—Babcock & Champion. Farmer's Electro Battery. Hill's Exploders. Stow's Flexible Shaft.

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Rubber Hose, Packing & Belting, Wired Suction Hose, Carbolized Hose, Steam Hose.

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SUCCESSIONS TO EAGLE WORKS MFG. CO.
MANUFACTURERS OF
STEAM ENGINES, BOILERS, AND STAMP MILLS
CRUSHING ROLLERS, AMALGAMATING MACHINERY
FOR SYSTEMATIC MILLING, SMELTING, AND CONCENTRATION OF ORES
AGENTS FOR
BLAKE STONE BREAKER
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FLOUR MILL FURNISHING
CHICAGO.
ROASTING CYLINDERS
GENERAL MACHINERY
Address, FRASER, CHALMERS & CO., Chicago, Ill.

GOLD, SILVER AND COPPER MINING,
Reducing and Concentration Machinery.
Hoisting Engines, Diamond Pointed Rock Drills.
Manufactured by M. C. RULLOCK.

THE JAPANESE PERSIMMON.

THIS EXCELLENT FRUIT

SHOULD BE ON EVERY FARM,
AND IN EVERY GARDEN.

I am now receiving regularly from Japan

An Assortment of Varieties
OF THESE TREES,

And can sell them at much less prices than they have
been offered at heretofore. The ages of my trees are

From One to Four Years,

So that fruit will be had on the larger trees in a year
or two.

KELSEY'S NURSERIES, OAKLAND,

OFFICE AND SALESROOM,

Corner Seventh and Washington Streets.

QUARTZ MILL AND MINE FOR SALE.

The Quartz Mine situated on Humbug Creek, Siskiyou
County, Cal., known as the New Eliza Mine, together
with a

Fifteen-Stamp Mill Complete,

A twenty-five horse-power steam engine, and all the ap-
purtenances thereto belonging, will be sold at a bar-
gain if applied for soon. For further particulars apply
to

C. JUNKER,

Bella Union Saloon, Yreka, Cal.

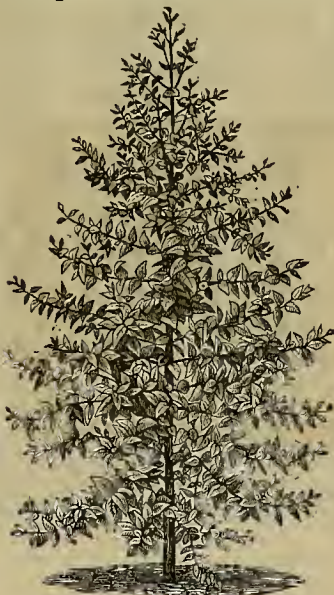
To Ship and Engine Builders, Steam-
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A Mechanical Engineer, having an extensive experience
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Ship Building, also in Steam Engines and Machinery in
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25 EXTRA MIXED CARDS, Snowflake, Oriental, Etc.
with 10 cts. J. B. HUSTED, Nassau, N. Y.

To Capitalists & Land Owners



EUCALYPTUS GLOBULUS,
OR BLUE GUM TREE.

We are now prepared to fill orders for BLUE GUM TREES,
for 1,000 to 50,000, and are selling and taking contracts at
Reduced Rates.

We are also prepared to take contracts to plant forests
of from 10 to 1,000 Acres in extent, or to sub-
divide large tracts of land with belts of timber, into 100
acre lots, or any given size required, and furnish and
plant the trees, or will plant avenues of trees from one
mile to any number required, or will contract to plant trees
on any HOMESTEAD or new TOWNS.

We are also prepared to plant forests of Gum Trees on
any of the HILLS in the SUBURBS of SAN FRANCISCO, from a
50-acre lot to 100 acres, or on any of the Sand Hills, after
they have been graded, or if not graded, if fenced,
so as to protect the trees from the drifting sands.

We would also call special attention to the fact that
land can be fenced in with Blue Gum Trees, and the cost is
much less than any other kind of fence, is more durable,
furnishes protection to growing crops, and saves ex-
pense in firewood, which has been fully demonstrated.

To persons having large or small tracts of land, we shall
be pleased to receive appointments, that we may
show them the great advantages of forest culture, and
can make such liberal propositions as will be greatly to their
advantage. Address,

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SAMPLE TREES AT OFFICE,

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FOR SALE—A Good Type-Writer. Price, \$50
For further information, address "COPYIST," this
office.

\$1,000 Challenge Ore Feeder.



HENDY'S \$1,000 CHALLENGE ORE FEEDER.

I call my Automatic Ore Feeder the \$1,000 Challenge, because I challenge the owners or backers of any other feeder to a competitive test for that amount. As Mr. C. G. Rodgers, Superintendent of the Green Mountain mine, near Greenville, Plumas county, appears prominently as a detractor of the merits of my feeder, and seems confident that another one is better, perhaps he will accept this long-standing challenge which the owners of other patents will not, and give me an opportunity to prove publicly the superiority of my machine. As to Mr. Rodgers' assertion about my feeder wearing out, it is no less fallible in that respect than other machinery; but I have over 250 now in use, some of them for over two years, and have never had to expend 25 cents for repairs. The fact that my feeder received the premium at the late Mechanics' fair, and that I am shipping several feeders weekly to different parts of the country, is sufficient proof of the appreciation in which it is held.

As to my feeders having been thrown out of the Gold Stripe mill, they were not displaced for inefficiency, as the following letter will show, and it answers also as a complete refutation of Mr. Rodgers' statement:

OFFICE SUPERINTENDENT OF THE GOLD STRIPE G. M. CO.,

GREENVILLE, PLUMAS CO., Oct. 16th, 1877.

JOSHUA HENDY, Esq.—Dear Sir:—Your favor of the 15th instant at hand. In reply to your inquiry as to the working of your ore feeders at our mill, we can say that there is no fault in the machines, and we consider them the best now in use. At present they are not in use with us, owing to the construction of the mill, which we are about to rebuild and make proper arrangements for putting in your feeders.

J. K. OWEN,
Superintendent Gold Stripe Mine.

One of the principal owners of the Gold Stripe and Green Mountain mills is also largely interested in the Plumas National mine, where I have just shipped several feeders, showing the confidence placed in the machine by these gentlemen who have used it.

Now, if Mr. Rodgers is sincere in his belief as to the merits of a rival machine over mine, here is a chance for him to make a thousand dollars easily, if he can get the owners of the machine to lend him one for the trial, which is the only doubtful thing in connection with the matter. Mr. Rodgers' eight months' experience with both machine ought to give him confidence enough in his own convictions to accept the challenge offered to him, or any one else.

JOSHUA HENDY.

Corner Fremont and Market Streets, San Francisco.

It may be considered as now fully demonstrated, by careful and long-continued experimentation, that the plan upon which a perfect ore feeder must be constructed is that of the carrier, and not that of the shaking table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Spasmodic or jerky contrivances will not answer the purpose.

We warrant the machines to give perfect satisfaction, and to be a better and more durable Feeder than any other the market, and will sell them as cheap as any other of its class.

ENDORSED BY THE FOLLOWING PARTIES:

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J. F. Lightner, Room 53, Nevada Block, S. F. Cal.
O. H. Bogart, 402 Montgomery St., San Francisco, Cal.
Bardwell, Walter & Co., 408 California St., S. F., Cal.
Haggin & Tevis, 50 Nevada Block, San Francisco, Cal.
Elipse Mill, Independence, Inyo County, Cal.
Silver King Mining Company, Arizona.
Gold Stripe Mining Company, Plumas County, Cal.
Crescent Mine, Plumas County, Cal.
Hidden Treasure, Deadwood, Black Hills.
S. B. Schrontz, Del Norte, Colorado.
Little Anna Mine, Colorado.
Briggs Bro., Block Hanker, Colorado.
Ontario Mills, Parley Park, Utah.
Julian Mill, Newcastle, Placer County, Cal.
St. Patrick Mining Company, New Castle, Placer Co., Cal.
Bunker Hill Mill, Amador County, Cal.
Gover Mining Company, Amador County, Cal.
Talisman Mining Company, Amador County, Cal.
O. C. Hewitt, Keystone G. M. Co., Amador City, Cal.
Boston Mill, Gold Hill, Nevada.
Soulshy Mill, Tuolumne County, Cal.
California Company, Nevada County, Cal.
Omaha Gold Mining Company, Grass Valley, Cal.
Star Mine, Sonora, Tuolumne County, Cal.
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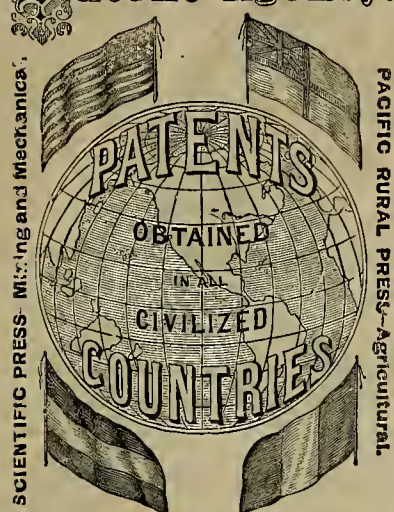
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A. L. HUNSAKER.
Messrs. DEWEY & Co., Patent Solicitors, S. F.

IONE VALLEY, Cal., January 20, 1878.

Messrs. DEWEY & Co.—Gentlemen:—I received my patent last night, and was glad to find that you were so prompt in the matter. I am pleased to give you the credit due you for the faithful and honorable manner in which you have discharged your duty in getting my patent. I shall hereafter recommend you to the public as having discharged your duty with honor. Yours, etc.,
W. W. CARLIE.

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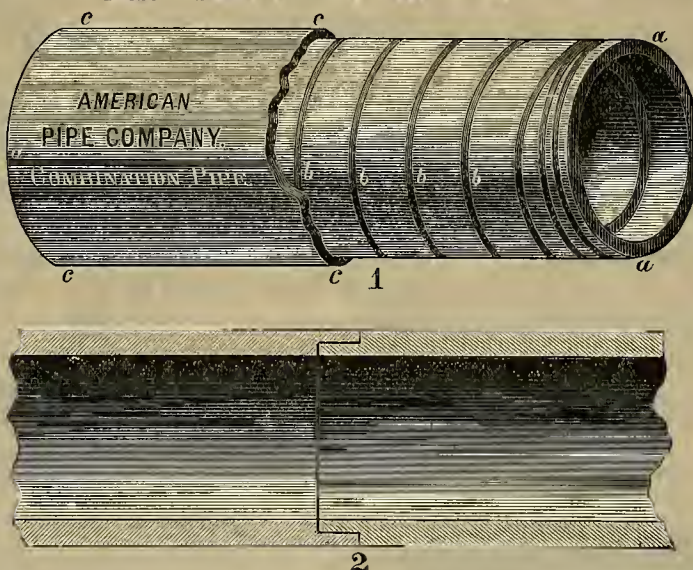


Fig. 1. View of Pipe. Fig. 2. Horizontal Section and Connection. aa Cylinder of Wood. bb Bands of Iron. cc Coating of Hydraulic or Asphaltum Cement.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, FEBRUARY 9, 1878.

VOLUME XXXVI.
Number 6.

The Manufacture of Wrought-Iron Pipe.

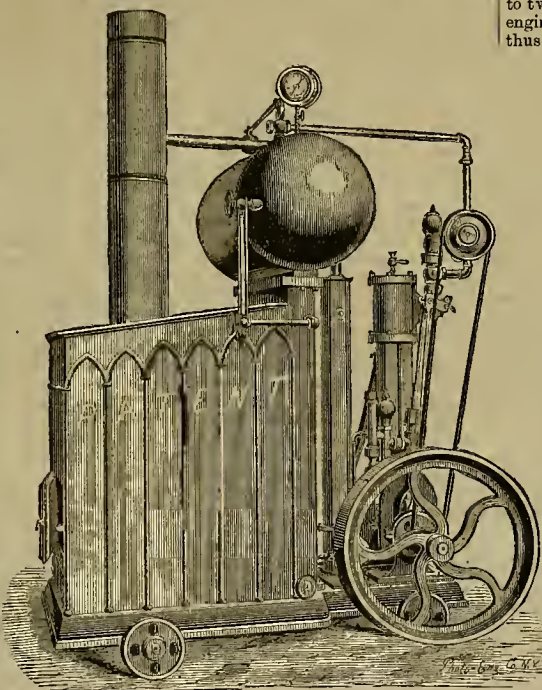
When hydraulic mining first began to be recognized as an important branch of mining in California, a steady demand for iron piping was inaugurated, which has continued in an increasing ratio ever since. It was soon found that wrought-iron pipe, from its comparative lightness, cheapness and strength, would answer this purpose best, until now the manufacture of this class of pipe has become an important branch of the iron business on this coast and particularly in this city. We now manufacture this pipe in sizes elsewhere unheard of and it is made to carry water under pressures that engineers outside of California would deem impossible. In fact, the use of this class of piping is peculiar to this coast, and considerable quantities of it are now sent abroad from here. In other places, they still manufacture and use the old-style expensive, heavy cast-iron pipe for conveying water, but this riveted wrought-iron pipe is fast coming into universal use on this coast, not only for conveying water for mining purposes, but for city water works, etc. The Spring Valley Water company now use large quantities of it, and at the Virginia and Gold Hill water works it is standing a greater pressure than the pipe of any water works in the world. Very extended experience in mining operations has proved this class of pipe to excel all others for conveying water, so that its use is now universal in that business here and elsewhere.

Francis Smith & Co., 130 Beale street, in this city, make a specialty of this piping and manufacture large quantities of it. During a recent visit to the factory we had an opportunity of examining the process of manufacture and gaining a few points of interest in connection with it. Mr. Smith first began to make this pipe, on a small scale, as far back as 1856, while he was mining in the mountains, and he has continued in the business ever since. He now ships it from here as far east as Denver, Colorado, and supplies it not only to California, Nevada, Oregon, Montana and Idaho, but also South America, Central America and Mexico. Not long since he shipped a lot from here to a mine about 100 miles south of Aspinwall, on the Atlantic side. He continues to make large quantities for this State, most of it being made to order. Among other large companies, he has supplied the Amador Canal company for years, made it for the El Dorado Water and Deep Gravel company, Spring Valley mining company, at Cherokee Flat, and hundreds of smaller companies all over the State. For water works this wrought-iron pipe is fast superseding the old cast-iron piping. Mr. Smith has put in ten miles of this piping at Menlo Park, nine miles for the town of Petaluma, six miles at Santa Rosa, two miles at Cloverdale, three miles at Carson City, three miles at Winnemucca, two miles at Reno, three miles at San Buenaventura, four miles at Santa Barbara, and smaller quantities at other places too numerous to mention. Ten miles of this pipe is used to bring the water to the Northern Belle quartz mill. Mr. Smith is just about to put down a quantity of lap-welded pipe for the city of Watsonville.

American iron is used in making this style of pipe, the process of which is very simple. The sheets of iron are taken to a punching machine, which punches all the rivet holes on the edge at one motion. The sheet is then lapped in a circular form, with one edge over the other, and riveted. These lengths are from 24 to 30 inches long, according to the size of iron, the rivets being proportioned to the size of pipe. The short lengths are passed to other workmen, who join them together by rivets in lengths of from 15 to 28 feet. The short lengths are made slightly tapering, so that one end will fit in the

other. This completed sections are then dipped into a preparation of asphaltum, which coats them inside and out. Long tanks are provided, and the preparation is applied boiling hot. The pipes are dipped and raised out of this bath by machinery. They are allowed to remain long enough to get thoroughly heated before being removed. The pipe thus coated will last underground for at least 20 years. Notwithstanding the dry season large quantities of this piping were sold last year for mining purposes. For supplying hydraulic mines the long lengths of pipe are not riveted together, but simply slipped one end into the other; for water works, however, they require riveting together. The firm sometimes prepare the iron for being made into pipes, and ship it to the ground in that condition, where it is made up.

In addition to the manufacture of this style of pipe, a lighter air pipe for mines is made at these works, in sizes from 5 to 11 inches. It is plain sheet-iron, coated with asphaltum. It is riveted, and made in sections about 20 feet long for convenience in shipment. Large quantities



THE KING PATENT ENGINE.

of this pipe are now made for the quartz mines on this coast.

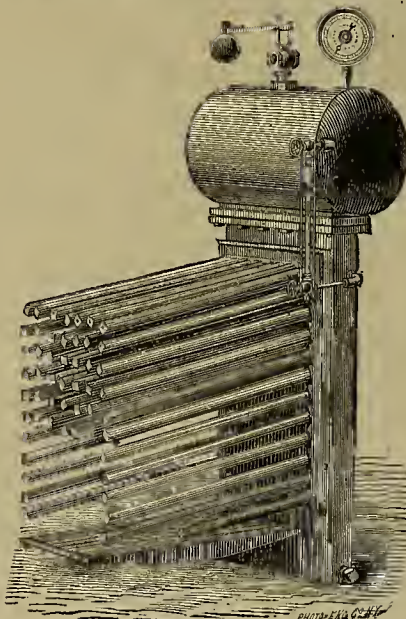
The firm also make a wrought-iron wheelbarrow of their own patent. The handles are made of channel iron, which is much stronger and lighter than the common gas-pipe handles. The wheel is of wrought-iron spokes, etc., with cast hub. These barrows are very strong and durable and weigh, according to size, from 60 to 95 pounds. They also make galvanized-iron boilers for houses. These are made of a capacity from 25 to 100 gallons. They manufacture at this place, also, the pipes or nozzles for Hoskins' Little Giant, so extensively used in the hydraulic mines. They keep in stock lap-welded pipe, which is used for supplying water to towns. There is some of this kind of pipe in the yard of the factory now, with flanges on each end of the section, so that they may be bolted together and used for pump columns. This was made to order. Most of the material described is kept in stock, but the larger sized pipes are manufactured to order.

MR. JAMES D. HAGUE has been tendered the position of Expert Commissioner in the Department of Mining on the Paris Exposition Commission, and has accepted. No better choice could have been made, as Mr. Hague is eminently qualified for the position by intelligence, education and energy, and his report will be of the highest value to the mining community.

The King Patent Portable Engine.

We present herewith a fine engraving of the King Patent Portable Engine, which is being rapidly introduced throughout this coast, and which is becoming very popular with all who are in need of a cheap yet satisfactory steam power. This engine is manufactured by Hollis, King & Sons, at Corry, Pa., but the agency for this coast is at Nos. 250 and 252 Market street, where the different sizes can be seen. This engine is peculiarly adapted to all the various industries to which small engines can be applied. It is so simple that the common laborer can manage it, and yet so strongly constructed as to resist the severe labors and abuses frequently imposed upon it by ignorant persons who will not take the pains to become acquainted with the use and management of steam power.

As will be seen by Fig. 1 of the engraving, this engine occupies but a very small space. It is made of four different sizes, ranging from two to twelve-horse power. It will be seen that the engine is not connected directly with the boiler, thus avoiding any danger from the explosion or



BOILER FOR KING ENGINE.

contraction of the boiler. As the engine is vertical, it will at once be seen that all side wear is avoided. The Judson governor is used on every engine, and so thorough is every part of this engine made that a first-class steam power is secured at a very low price. By those who have given the King engine a thorough trial it is stated that for use in irrigating the farm lands of this coast this engine is almost indispensable. We are told that it has been proven by actual experiment that a No. 2 King engine will irrigate 40 acres of orchard, raising water from 25 to 30 feet at an average cost for fuel of from 50 to 75 cents per day, and that a No. 3 engine will irrigate 50 acres, raising water from 50 to 60 feet, at an expense not exceeding \$1 per day. These engines are now being mounted on wheels, so as to make them still more convenient for farming purposes.

Fig. 2 represents the boiler used by the King engine. Every boiler is tested at a pressure of 350 pounds to the square inch, before being placed on the market, and every engine is steam-run in order to see that it is perfect. Taken as a whole the King engine and boiler are models of compactness, and for farm use, for mining purposes, printing offices and all of the lighter work where steam power is used, it answers every purpose excellently. Circulars containing full descriptions of this engine can be had by addressing, King & Wilber, 258 Market street, S. F.

California Still a Mining Country.

We notice that some of the Eastern papers appear surprised to learn that California is still a gold producing region, and they apparently labor under the impression that mining has been almost abandoned here. Such ignorance is somewhat lamentable, but probably the fact that Nevada has sent rich mining men to represent her in the National Assembly and no California miners have cropped up in politics, has in part created the impression. California contributed last year nearly nineteen millions in gold to the metallic currency of this nation, and in all probability will make a larger donation this year. A very large proportion of people within her boundaries have also contributed this capital to work mines in Nevada, Idaho, Arizona, Utah, etc., and are still interested in these mines.

In the State itself mining instead of being a retrograde business is advancing. Many people who have tried silver mining with poor success, are falling back again on California mines to make good their losses. They say it takes a gold mine to run a silver mine, and if the reverse of the proposition is also true, silver being worth less than gold, the gold mining ought to pay the best. There were any number of claims started up in this State last year on a legitimate basis which will make a record in the returns of 1878, and hundreds of others were put in a shape to be made more profitable than heretofore.

The gravel mining industry is spreading wider and wider, and as it becomes better understood, pays better. This is to a great degree affected by dry seasons, the same as the farming interests are affected. They must have an abundance of water to work a large hydraulic mine, and in dry seasons the water is of course not available. Now that abundant rains have come, however, the claims are all at work making up for time lost during last season, when the water supply was short. There is one thing about the California miners which is peculiar. They seldom if ever make any great "blow" about their mines—that is in the regular mining sections. In the "cow counties" sometimes if a prospector finds a pretty good prospect he gets some one with more knowledge of cashes than quartz to write it up, and the consequence is an exaggerated report. But in the regular mining sections this is not so. The men go on about their work and rather prefer privacy about their affairs. In most other parts of the coast men are anxious to attract capital to their locality and make a great fuss about any "find" no matter how insignificant. We never hear of any labor strikes among the California miners, or any political combinations. As a class they are peaceable, quiet and prone to mind their own business. Even in the controversy now going on about the debris question, they have done little talking and have taken no pains as yet to put their side of the proposition before the public.

This characteristic is one reason, perhaps, why little is known in the East about the California mining of to-day. The great bonanza on the Comstock has attracted the attention of the world to that locality, and most of the world imagine that the only place on the coast where mining is carried on. We are still at work, however, in California, and although the shallow placers and rich gulches of the "days of '49" are things of the past, we are able to turn out somewhere in the neighborhood of a couple of millions a month in pure yellow gold, a good deal of which we send East for the little things we need here. If mining was stopped altogether in California perhaps some of those people arguing for a return to specie payment in the Eastern States would have to stop talking and stick to their greenbacks.

PACHECO has been unseated by the House.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—E. S.

Idaho Mines.

EDITORS PRESS:—Idaho City lies some 70 miles southeast of Boise City, and is probably one of the richest mineral districts in the Territory. There are numerous ledges of gold quartz of fabulous wealth throughout the county, but those most developed are situated at Red Warrior and the vicinity of Rocky Bar, the county seat. Eighteen miles from Rocky Bar is the town of Atlanta, near which is the famous Atlanta lead. It seems to be the mother lode of the entire range. It is a well defined lead of silver ore 60 feet in thickness. There are at present but three companies operating upon this lead, but they are going for it as though they meant business. The oldest company operating here is the Monarch. They have two mills and crush wet and concentrate with a Frue concentrator and reduce to a value of from \$500 to \$1,000 per ton, and ship to Omaha. The only ore worked at their mills is such as run from \$300 per ton down. The high-grade ore which generally runs from \$500 to \$1,500 per ton, they ship direct to Omaha for reduction. Their annual shipment is from 100 to 200 tons.

The Buffalo company have a tunnel tapping the ledge 100 feet below the surface, and are now sinking a fine shaft of three compartments on the ledge. They are in very rich ore. They also ship their high-grade ore to Omaha for reduction. They shipped last season 115 tons that paid from \$500 to \$10,000 per ton, netting them over \$500 clear of all expenses. This ore must be packed on mules 18 miles, carried on wagons 250 miles and by rail nearly 1,500 miles. They have a 10-stamp mill and furnace, and work here all low-grade ore from \$500 down. They have a large amount of such ore in the dump, more than the capacity of their mill.

The Atlanta company was organized in San Francisco June 23d, 1877, and consists of gentlemen from Boise City, San Francisco and Meadville, Pa. They own 800 feet on the Atlanta lead adjoining the Buffalo. Capt. R. Bledso, the Superintendent, commenced work in July; sunk 230 feet and made two crosscuts; found the ledge 70 feet wide and well defined; found good ore and are now drifting on the ledge east and west. This company have not as yet commenced the erection of works for the reduction of their ores.

There is a branch of Boise river that flows by the town which affords ample water power for all purposes. Timber is abundant on the mountains, and, in fact, every facility for cheap working of ores is at hand. A good road could be constructed down Boise river to the wide, open valleys of Boise and Snake rivers, and with railroad facilities through these valleys, this would soon become a very populous and wealthy country.

The rainfall here since July has been as follows: July, 0.35 inch; August, 0.09; September, 0.27; October, 0.85; November, 2.05; December, 0.01; January (to the 24th), 0.63; total, 4.25. There had been no snow up to that time this winter in Boise City, but since January 24th there has been one inch of snow and two days of rain. A. B. ROBERTS.

Boise City, Alturas Co., Idaho.

New Tunnel Enterprise

In our issue of Saturday we mentioned the formation of a local enterprise, the Eureka tunnel and mining company. It deserves more than a passing notice, as every citizen, having the welfare of Eureka district at heart, is directly interested in its success. The tunnel site is located in Goodwin canyon, upon the east side of Prospect mountain, extending in a westerly direction, and in its line embraces mines from which has been extracted some of the richest ore ever taken out in the district. Ever since the foundation of the district our prospectors and mining experts have been convinced that the practical method to thoroughly prospect the old mountain was by means of a deep tunnel, but it remained for Gen. Connor to devise the method by which it can be done successfully, and almost wholly by our own people.

In conversation with the General, we found he had made almost daily visits to the mines for many months past, during which he carefully examined the formations, the dip of the ledges, and in many instances the broken condition of the ledge matter near the surface, which convinced him, as it does every thorough miner, that depth must be attained to fully determine the wealth believed to be hidden in Prospect mountain. With this end in view, he next sought the most eligible location for the site of the tunnel, selecting the point mentioned as being easy of access, and for the reason that great depth will be attained, and that it will tap veins which have proven very rich near the surface; among these may be mentioned the Piute, El Dorado, Indus, Luca, Mazappa, Magnet, Nil Desperanda, Tiger and Lemon, and in its line it will cross the Industry mine, now being worked by the Hartnett Brothers, who are taking out very rich ore. In many of these, and in others on Prospect, rich ores have been encountered in bunches, but in the majority of

instances the owners have been unable to prosecute work, owing to the heavy expense attending the sinking through the hard rock, and consequently have been compelled to abandon their claims, or simply perform the annual labor required by law to hold them, hoping that at no distant day an enterprise of this kind would be started which would enable them to determine the truth of their experience: that at depth vast wealth lies hidden in Prospect mountain, and also that they might realize from their mines.

The plan proposed to open the mountain is as follows: The company have purchased two mines, the Inca and the Indus which have ore in them; we believe the vein in one of the mines can be struck at the distance of 300 feet, and it is believed rich ore will be found.

The Board of Trustees have set aside a portion of the stock to be sold, the proceeds to be used as a working capital, the whole stock of the company to be forever unassessable or of being assessed and losing their interest. The plan recommends itself as well to the working man as to the man of means, and as it is proposed to dispose of the working stock at \$50 per share, it is within the reach of all.

The names of the Board of Trustees is a guarantee that the business of the company will be conducted justly, and the stockholders have a fair deal, and we hope our citizens will subscribe liberally to the new enterprise and thus not only lend their aid in developing our district, but enhance their own interests.—*Eureka Sentinel*.

El Dorado Quartz Mines.

Our quartz mines have been greatly neglected and the cause can easily be traced to the instrumentality of our own people. Meet one of them in San Francisco, or elsewhere, and inquire regarding our mines; almost universally, they will instantly reply condemning the same, though in doing so they cast a light upon their own prosperity. The facts are, the great gold bearing belt passes through our midst. We have had the richest placer mines in the State, as all know; then, if quartz is the mother of gold, we must certainly have the best quartz, and no doubt we have; but unfortunately we have no local capital, while thoughtlessly, no doubt, we are eternally discouraging outsiders, thereby throwing stumbling blocks in the way of our own prosperity. We have hundreds of gold-bearing lodes that have scarcely felt the touch of a pick. But, as we stand self-condemned, we must make an effort to counteract the baneful impression that has gone abroad regarding our quartz lodes. To do this, a joint stock company should be formed, composed of all business men feeling a common interest in the prosperity of our country. For instance, say 100 men, at \$10 per share, the money to be judiciously expended by a committee selected for the purpose, upon some one of our promising lodes, until it becomes a success. We certainly should have enterprise enough to undertake such a scheme, as it would cost but a trifle for each, and if successful, the benefit would be beyond computation. Capital would come in seeking investment, and we are satisfied, from careful study of the formation of the county, that we would soon rival Amador, on the south, and Nevada, on the north.

The Lord helps those who help themselves. Then why should such an enterprise be longer delayed, when so little could possibly be lost, and the results might bring us millions. Will not some of our energetic citizens take this matter in hand, call a meeting and discuss it, and if possible, organize, and go to work, determined to develop at least one good paying mine in the county. We should be glad to have others, familiar with the subject, express their views.—*El Dorado Republican*.

THE KING COMPANY'S AFFAIRS.—As is well known here, the affairs of this company have been under a cloud for several weeks. To a number of causes may be attributed this trouble, but the principal one, no doubt, was the failure of the wells to supply sufficient water when the furnace was all ready to produce bullion. Following this came dissensions among the managers here and a tardy disposition among the financial backers of the enterprise at the hay to remit the necessary funds to meet the pressing demands on the company here. This led to the company's property being placed under attachment. Thus matters stood, some three weeks ago, when Superintendent Fassett took his departure for San Francisco to consult with the company. Last Tuesday, Mr. Fassett, accompanied by Mr. Sweetapple, arrived from San Francisco, the latter gentleman, we are informed, as Superintendent of the King company, Mr. Fassett having resigned. Unlike too many of our contemporaries, in similar cases, we have no desire to—nor could we in justice do so—speak of the late Superintendent in any other terms than kindly. He has worked hard and faithfully for his company, and we only regret that better results were not attained. If mistakes were made—and they certainly were—we do not think the late Superintendent the party responsible for them. What the future course of this company will be, we do not know at this time, but it does not look reasonable that they will permit their valuable property to pass under the Sheriff's hammer, to satisfy judgment for a few thousand dollars. As yet no move has been made towards an understanding with the creditors.—*White Pine News*.

Russell Hill, Amador Co.

A correspondent of the Amador Dispatch has the following to say about Russell hill in that county, a locality very little known to the general reader:

Well, we are here, living on hope and anxiety; and that hope and anxiety are kept vitalized by the extensive preparations for mining that are being made in this part of the county. As a mining district, this has not flourished to any amazing extent, of late years; but at present there seems to be a renewal of active life and vigor, even among the old settlers—besides, many new-comers have been prompted to locate in our midst. It seems to be a difficult matter to induce moneyed men of San Francisco to leave the stock-boards or let money go out of their hands to invest in any solid or legitimate enterprise. But, nevertheless, and notwithstanding the holding off of the rainy season, this camp proposes to prosper.

Among the gravel mining enterprises, the old Russell hill is going to be swept off by hydraulic power, as it, or part of it, has been sold to a party from San Francisco, by the Hon. David Robinson, who also calculates to erect a hydraulic on the south side of the hill, which will be managed by the McGlofin Bros. The north side will be managed by J. L. Cook, who has things about ready for operation. Should rain fail to come, the same parties will spend their time in quartz mining near here. There is at this time a quartz mine being worked by the Robinson Bros., with as good result, perhaps, as can be shown in the county—the rock being sprinkled over with free gold, and will give a yield of at least \$75 per ton. Besides this, there are many other fine ledges being prospected with splendid results; so you see, if we have not water to hydraulic, we can, with profit to ourselves and county, work quartz. We intend to erect a mill this coming summer that will crush 30 tons per day, with cost of \$2,000, to which will be attached one of the finest concentrators in the world. The mill is to be of the Dawson patent, and the concentrator of the Davis patent. J. L. Cook is agent in this county, for both mill and concentrator.

Montana Furnaces.

Mr. Wm. Purvine, on his way from Glendale to Philipsburg, furnishes us with the following: Glendale is improving and business prospects growing brighter. The plant of the Hecla works comprises two water jackets, of 30 and of 60 tons capacity per day. The copper works are to consist of one three-hearth reverberatory furnace for roasting, and two stacks with two reverberatory furnaces each. The roasting reverberatory, one stack, and one reverberatory connected with it are running, the others being only partially completed. The cupel furnace was completed in November, and some 50 tons of hase bullion are now being melted, the lead being converted into litharge to be used for smelting, the fine bullion being easily handled and shipped. Water jacket furnaces came into use in 1868, and usually the water flows but little above the melting zone, but in these at Glendale the water flows to the top, which is pronounced an improvement on the original pattern. Armstrong has run as many as 400 bars of hase bullion, with an average weight of 90 pounds each, from the big furnace in a single day. His experiments with Butte ores reduced this season, has satisfied him that with his present facilities he can utilize from 4,000 to 6,000 tons of Butte ore per annum. He buys the low grade copper and manganese ores, such as cannot be reduced at Butte, owing to want of works and flux. The cost of transportation is about \$5 per ton. He intends to establish an ore purchasing agency at Butte at an early date.

The Trapper mines are running with about 75 persons in camp.

Murphy & Duffee's mine, in Philipsburg, is reported as looking better than ever before.

PLUMBAGO IN AMADOR CO.—The Amador Ledger says: Spencer V. Carter, who lives near Stony creek, brought to our office this week several specimens of black mineral, which he at first thought to be iron, but which men who have worked in that character of ore pronounce to be plumbago. The ledge is situated at the mouth of Stony creek, near Jackson valley, in a wild looking country covered with chaparral. Sixteen years ago Mr. Carter accidentally stumbled across the mine, and kept the discovery in his mind, believing it would eventually prove of value. After allowing it to remain idle for that long period, the other day, in company with Charles Morrow, who is part owner in the claim, started out to hunt up the ledge afresh, and relocate it. They found the spot after considerable difficulty. A shaft sunk to a depth of only a few feet shows a vein of ore ten feet in thickness—said to be an immense lode for that class of mineral. The samples of rock left with us are soft, easily cut with a knife, and cannot be handled without blackening the hands. Plumbago is commonly known as black lead, and is largely used in the manufacture of lead pencils. It consists principally of carbon, with usually more or less iron mixed with it. From the softness of the specimens left us we should judge that very little iron enters into their composition. Parties who understand plumbago ore informs us that in mines they have worked in, the crude ore has realized \$10 per ton on the dump. Messrs. Carter and Morrow will shortly have samples of the ore assayed, when the value of the discovery will be definitely known.

The Cariboo Quartz Mines.

The Victoria Colonist, of Jan. 6th, contains an extended account of recent developments of rich quartz mines in Cariboo districts.

The whole country extending from Antler to Red galch, although snow-covered to the depth of several feet, is corrugated with snow-shoe and foot tracks. Every old miner is engulging his brains to recall to memory the various quartz ledges he has seen in his prospectings. At the present moment there is an absence of the excitement which characterized the prospecting of early days of Cariboo. The men here go quietly to work with snow-shoes, compass and shovel, and with the latter clear away snow from croppings and stake claims. The favored locality for staking claims the past week has been the ground lying beyond the Black Jack tunnel and the British Columbia company's ground, which is to an extent prospected, as the rock can be seen at a distance of 40 feet below, and from it some rich samples were had yesterday from the drive which that company are making across their lode. The whole extent of ground between the two points above named was staked off, and the prognostications are that the bonanza runs through the ground staked. The character of the rock taken from the British Columbia shaft favors this theory. Another theory prevails, and that is that the Bonanza and Steadman ledges converge at or near the British Columbia shaft, and hence the richness of the ore at that point. The claims lying between the St. Laurent company and Enterprises are par excellence the straight-up bonanza claims. On Grouse creek a number of claims have also been taken up, and rock has been brought from that vicinity which is pronounced by Mr. Inderstroth to be rich. It is of a honey-comb variety, and assays as high as \$78 from croppings. Between the British Columbia shaft and Grouse creek, the Prosperine, Pluto, Diver and Dow companies are at work prospecting the lode. Interests of 100 feet in the three former are held as high as \$1,200, and sales have been made at these rates. Prosperine and Perseverance being the favorites, no interests are being offered. More northerly still are the locations of Geo. Byrnes and Sam Walker, and others. Should these claims all contain bonanza ore, and the character of the quartz justifies the belief, it will prove to be the longest stretch of paying quartz known in the mining world.

On another line are located several claims, prominent among them is the Vivian. This company are at work in the old Jenkins diggings, and it is reported that they have the ledge. The Steadman is again attracting attention through the efforts of the Cariboo Quartz Mining Co., who are running a drive across the lode and are now taking out a class of ore declared by Mr. Inderstroth, the company's amalgamator and assayer, to be far better than that milled last fall from which the first bar was obtained. The Enterprise tunnel is in 100 feet and is pronounced an uncommonly good job. It is estimated the ledge will be struck at a further distance of 160 feet. The Perseverance Co. have run a cut on the ledge and are taking out rock to be tested. The Vivian Co. are cutting into the lode discovered in the Jenkins ground, a distance of 70 feet below the surface, and are also running a cut across croppings above ground. In fact general activity prevails. There are or need be no idle men, as all the companies are doing work of one kind or another on their locations.

LIFE IN BODIE.—Frank McDermot, of this place, has received a letter from E. S. Williams, who went up to Bodie some time ago. "Scotty" does not give a very flattering account of life in Bodie. He writes from Bodie on the 17th instant, and after speaking of what several of the boys are doing, who went from here to that place, he says: "It is storming fearfully and people are flocking here and have neither friends or money. To-night a woman came into town and could hardly find a place to go to; no room for anything or anybody. I cannot for the life of me see what is bringing people here; there are 10 for every job. This is a hard place; the thermometer is sitting opposite me on the table, four feet from a red-hot stove, and registers 62°; the wind howling, the snow falling and drifting make altogether a very dismal picture, and prompts one in comfortable quarters to pity the homeless and homeless. Every space large enough to contain a human being is filled; saloons and lodging houses are full and lots of all-night stove-warmers up at the mill, where they stand in the furnace-room to keep from being frozen. I would not advise anyone to come or stay away; let all do as they choose, then they will be satisfied."—*Coso Mining News*.

ADDED MACHINERY.—The Eureka company are adding a large amount of machinery to their mine and have a still larger lot on the way from San Francisco. The piping will be used to convey power from the surface to the lower drifts, to run the small engines used down in the depths of the mine. These latter are employed in raising ore, driving drills and otherwise facilitating the economical work of sinking winzes, running crosscuts, etc. It is a busy and interesting underground scene, and the process of developing and extracting the great ore bodies employ a multitude of men day and night. We are informed that the mine never looked more promising and its immense resources have been hardly drawn upon, a fact that is full of promise, not only to the fortunate shareholders but also to every resident of Eureka.—*Sentinel*.

MECHANICAL PROGRESS.

Centering Work for the Lathe.

In his articles on tools and their uses in the *Polytechnic Review*, Prof. Sweet, of the Cornell Mechanical School, writes at length of the way to secure an accurate and durable "center" in pieces of work for the lathe. We shall quote therefrom some of his positions on the subject which are, we think, suggestive: After the ends are centered with the center punch and found to be sufficiently near the center for the purpose, small holes should be drilled in the ends of the piece below where the points of the lathe-centers are expected to penetrate. Care should be taken to have these holes as true in line with each other as possible. I have not been able to find or devise a rule for determining the proper size of these holes. In fact, materials and circumstances are so varying that there would be so many exceptions as to render a general rule worthless. Why the holes should be drilled extra deep is because they then tend to wear ton fit on the lathe-center; whereas, if a lathe-center strikes the bottom of the hole it soon wears a loose fit and the piece no longer revolves true. The center holes should then be counter-sunk just enough to enable the ends of the pieces to be squared off truly in the lathe, which should be done, and the holes again counter-sunk deep enough to give a proper bearing on the lathe-centers. Why the first counter-sinking should not go deep enough to render the second operation unnecessary is this: If the end of the piece is not square the counter-sink will not follow the center hole, but will cut off one side more than the other; then, when the other end is squared off, there will be a wider bevel on one side of the hole than the other; so that as the center wears, the axis of the piece is constantly changing; for the same reason that the end of the piece must be squared off the first thing. If the last counter-sinking could be done perfectly true with a center-punch instead of a counter-sink, the center holes would probably be more enduring and better; but without a guide it is difficult to do.

In centering steel that is to be hardened and ground, a true conical counter-sink is not the best form; for in hardening the center may change to an oval form, and when ground the outside of the piece may be equally oval. To obviate this, a center punch, "three-lobed" in section, should be driven in so as to leave three bearing surfaces in the counter-sink, which will always fit a conical center and be free from shake. When the last counter-sinking is done, it is true with the center hole, true with the end of the piece, and stands a better chance of wearing true than it would were not these precautions taken. So, too, in boring holes in pieces chucked to the head-stock, the work should be faced off before commencing to bore, not only because a true hole cannot be bored without so doing, but also to remove the scale from the iron, avoiding dulling the boring-tool every time a new cut is commenced.

Absolute truth is so near an impossibility that to approach it, it is necessary to observe every precaution; and when a piece of work has to be operated upon from both ends, no part of it should have the finishing cut taken until it has all been roughed off, and the piece changed ends once or twice during the operation. This, not only because the piece is liable to spring from the removal of the outside, but because the centers should be worn to their seat. In preparing pieces to be turned on centers they should, in every case possible, be cut to the proper length at first, so the centers will remain in when the work is finished.

WIRE FROM AMERICAN IRON.—Richard Akerman, of the Stockholm School of Mines, warns the Swedes that the Americans are making wire of their own iron. He says that Washburn and Moen substitute iron made in Pennsylvania and American Martin and Bessemer iron, for iron previously imported from Sweden, so that while they formerly imported yearly from Sweden for their wire works about 4,000 tons, they took in 1876 only 1,000 tons Swedish iron, the use of which is now limited to the nicest applications, as gun-screws, etc. That the Lancashire iron which they make is exceedingly good was shown by their splendid exhibit at Philadelphia, which, among other things, contained a bundle of wire, made from their own Lancashire iron, of the fineness No. 43, which bundle only weighed 11½ pounds, while the length of the wire was 21 miles. There was also a bundle of wire weighing 526 pounds, with a diameter of 3-16 inch, and a length of 5,402 feet.

HINT FOR BORING A DIAL.—The following method is very simple, but, says the *Jeweler*, some watchmakers are not familiar with it: Take a sheet of paper the size of the dial and glue it on to the dial plate after cutting through the paper an opening corresponding to the engraving, etc., which is required. Make the holes of the required size with a graver; the etchings can be made and the angles rounded with crushed pumice, and then the whole polished with enamel powder or diamantine. Then place the plate in water and the paper falls off. By this method there are no scratches on the dial.

The Year in Iron and Steel.

The year 1877 has seen an increased demand for our iron and steel products as compared with 1876, neutralized, however, so far as producers were concerned, by a very marked decrease in prices, a result which not only prevented an increase in the wages paid to labor, but, in some instances, compelled still further reductions. The *Bulletin of the Iron and Steel Association* says:

We have referred to the consumption of iron in 1877 as having been larger than in 1876. This increase, we believe, applies to all branches of the trade, excepting, perhaps, iron rails, and including all steel products. Of the fact that there really was an increased consumption there can be no doubt, but how great was the increase we shall not know until our returns of production for the year are received. It seems certain that the conversion into marketable products of old rails and scrap iron was greater in 1877 than in 1876. Fully as much pig iron was manufactured in 1877 as in 1876, and we think about 10% more. The product of 1876 was 2,063,236 net tons. In 1875 the product was 2,226,581 tons. The product of 1877 will closely approximate if it does not slightly exceed that of 1875. The stocks of pig iron on hand and unsold at the close of 1877 are less than similar stocks were a year ago. In the Lehigh valley they were much less. All these facts and conjectures, which will be sustained by the official figures, confirm the impression that there was an increased consumption of iron in 1877 over 1876.

The production of Bessemer steel in 1877 was as great as the product of 1876, which was 525,996 net tons of ingots and 412,461 tons of rails. The production of steel rails in 1877 will not vary greatly from 450,000 net tons. The production of iron rails in 1877 will not vary greatly from 450,000 net tons. The production of iron rails in 1876 was 467,168 net tons, which was hardly equalled in 1877.

The imports and exports of iron and steel in 1877 corresponded very close to the imports and exports in 1876. There has been no change in the quantities or values of either imports or exports that is worthy of special mention. Notwithstanding all that has been said about an increase in our exports of manufactures, the aggregate of our exports of iron and steel, and of locomotives, machinery, car-wheels, cutlery and other iron and steel products did not materially increase in 1877 over 1876. It is a consolation, however, to know that our imports of iron and steel did not increase.

A NEW CLOCK AT THE NAVAL OBSERVATORY.—Commodore Dimpel and Mr. Sloane have invented a new astronomical clock, which is now being introduced into the Naval Observatory at Washington. It has a mercurial compensating pendulum, but the novelty consists in this, says the *Jeweler and Silversmith*: Every time the pendulum vibrates its lower point, made of platinum, passes through a globe of mercury, and this contact establishes a connection with a voltaic battery, arranged in such a way that every time the contact is made a ratchet wheel with teeth will move one ratchet and produce a tap. At the tenth ratchet a platinum arm dips into another drop of mercury, making a circuit with another sounder giving a louder tap, so that every 10 seconds the louder tap helps in counting the number of seconds. It is stated that by this arrangement an observer is enabled to rate chronometers to half a second, and by continued ratings the computation of errors may be reduced to an infinitely small fraction—in fact, it is claimed that the operator can rate chronometers as fast as they are put before him; but this is evidently an exaggerated statement.

AN OLD IRON CAR.—The private car of President Cass, of the Fort Wayne road, which has the number "100" inscribed on it, was built 25 years ago. It is constructed entirely of iron, and has been repeatedly thrown from the track and rolled down embankments, and never yet been damaged to the extent of an indentation. Wooden coaches have been "telescoped" and gone to smithereens all around it, and it has always come out without a scratch. But it is an oven in summer time and a refrigerator in winter.

HARD BRONZE.—The ancients used brass, or rather bronze, for cutting instruments, and added tin to the brass to make it hard. Copper and tin alone is too brittle; copper and zinc too soft; but these three metals make a very hard alloy. Experiments by Chautry in England have proved that the proportions to obtain the hardest alloy are 5 parts of tin, 5 of zinc, and 32 of copper. He even made a razor of this alloy, and it proved almost as hard as tempered steel; files would not touch it, except when they were quite new, and then they were soon destroyed.

WOOD AND IRON.—Herr Hirn has been conducting a series of experiments, in Germany, on the comparative strength of wood and cast iron in their different applications, and finds that in a great number of cases the former has the advantage. Prof. Hirn finds the strength of wood to be in direct ratio to its density and this strength is increased by immersing the pieces of wood in linseed oil, heated from 185° to 212° Fahr., and letting the wood thus immersed remain for two or three days, or until partially saturated.

SCIENTIFIC PROGRESS.

Aerial Telegraphy.

We have already given items concerning the system of telegraphing without wires, which is put forth by Prof. Loomis. Doubtless a fuller description of his experiments and results attained and anticipated will interest many readers: Prof. Loomis has been in the mountainous regions of West Virginia for some months, conducting a series of experiments with his proposed aerial telegraphy, has demonstrated finally that telegraphy without wires is practicable. His manner of operating consists of running a wire up to a certain altitude, reaching a particular current of electricity, which, according to Prof. Loomis, can be found at various heights. At any distance away, this same current can be reached by a wire, and communication can be had immediately. The apparatus necessary to bring about this wonder is very simple and inexpensive. It has been fully ascertained that telegraphic communication does not take place over or through the wires, but through the ground. This same communication continues when these electric currents applied by nature are used. Prof. Loomis has telegraphed to parties eleven miles distant by merely sending up a kite at each end of the distance, a certain light, attached to which, in place of the ordinary string, was the fine copper wire. When both kites touched the same current, communication was had between them, and messages were sent from one end to the other by means of the ordinary Morse instrument in connection with the instrument invented by Prof. Loomis. This showed that the theory on which he had worked for many years was the correct one, and that by the proper means, such as stationary wire arranged from natural or artificial eminences, could be operated successfully at all times. It is true that aerial telegraphy may not be much of a certainty during violent storms or electric showers, but it will not meet with more obstructions than the ordinary wire telegraphing, which is not at all sure during the periods spoken of. It will be a long time before aerial telegraphing can be carried on between places which are but a short distance apart, if indeed it ever will. In such cases the wires will continue to be used, though for long distances, such as for telegraphing from one side of the ocean to another, the aerial telegraph will take its place entirely. Prof. Loomis has a scheme now on foot for a series of experiments from a point on one of the highest peaks on the Alps, in Switzerland, to a similarly situated place on the Rocky mountains on this side of the world. If this succeeds, of course his invention will rank in importance with that of the electric telegraph itself, and be even greater than that of the telephone. All of the money necessary to carry on the experiments has already been promised, and it will not be many years, if it turns out to be a success, before ocean cables will be one of the lost arts, which, having played its part, will be laid aside. The cost of aerial telegraphy will not be over one cent when the other is \$1,000.

ACTION OF THE TELEPHONE.—Prof. Barrett delivered a lecture "On Telephones," at the London Institution. He said the first idea of conveying sound by artificial means was credited to Dr. Hooker, in this country, 210 years ago, and the accomplishment of reproducing articulate speech by electrical means to Reiss, a German schoolmaster, in 1851, of whose experiments some notes were read, communicated to the lecturer by Dr. Messel (who had been Reiss' pupil). Gray's discoveries and instruments were noticed, as also Varley's musical telephone. Prof. Graham Bell's speaking telephone was finally introduced and its action explained, the lecturer attributing the sound-producing vibrations in the receiving disc to exceedingly minute mechanical motions, mechanical vibrations of 1-25,000,000 of an inch being equal to the production of an audible sound.

METRIC SYSTEM.—Congressman Marsh has introduced a bill providing that on and after January 1st, 1879, for all postal charges 15 grammes shall be substituted for one-half ounce, and so on in proportion; that the Postmaster-General shall furnish all postoffices with postal balances denominated in grammes of the metric system, and that on and after January 1st, 1880, the metric system of weights and measures, as legalized in the Revised Statutes, shall be obligatory. Marsh also introduced a bill to establish the metric system in the coins of the United States, and provide for and regulate coinage, including the new coin-metal called gold.

INFLUENCE OF ORGANISMS ON EGGS.—MM. Beauchamp and Eustache have determined that eggs may remain for long periods in a medium filled with infusoria, without the latter traversing the shell and penetrating the interior. The shell, however, allows the passage of microscopic mucedinae, which make their way through the lining membrane and develop very abundantly on its internal face. The membrane surrounding the yolk presents, however, an insurmountable barrier to their further progress, but should their entrance into the yolk be effected an alteration takes place, which is a true fermentation, and distinct from putrefaction.

Electricity and Capillary Attraction.

Dr. J. W. Draper makes the following observations upon the development of electricity as modified by capillary attraction:

When a glass plate is laid on the surface of quicksilver, a considerable force is required to separate them. On the separation being made, if the substance be examined by the electroscope, the glass will be found to be electrified positively, the mercury negatively. Their attraction or adhesion is, therefore, a necessary electrical result. So intense is this electrical development, that if, during the act of separation, the mercury be in connection with a gold leaf electroscope, the gold leaves are commonly torn asunder.

In like manner, if some melted sulphur be poured into a conical glass and permitted to solidify, on making the separation the interior of the glass and the solid sulphur cone will be found to be in opposite electrical states. And the same occurs when surfaces of various kinds are parted from each other. There ought, therefore, to be adhesion.

But if a glass plate be laid on a surface of water, there is no apparent development of electricity on separating them. And the reason is obvious, for the glass has brought away with it a layer of water, and there has been no true separation of the solid from the liquid, but only of water from water. The force of adhesion of the glass to the water has exceeded the cohesion of the water for itself.

If a plate of polished zinc be laid on mercury, there will again be no electrical development apparent on separating them. For, owing to the conductivity of the zinc, there is nothing to prevent the opposite electricities from uniting, and all electrical manifestations must cease.

Whatever can disturb the electrical relations of a solid and a liquid will disturb their capillary. On wetting the interior of a glass tube, so as to form a temporary tube of water, and placing some mercury in it, the mercury will be depressed below the hydrostatic level. But on connecting the mercury with the negative pole of a voltaic battery, and the water with the positive, the mercury at once rises, their mutual attraction being increased.

The Carrying-Power of the Glaciers.

In North America, and especially throughout the Northern States, the boulders are numerous, often of very great size, and indicating transits of many miles. In an article on the "Ice Age" in the *Popular Science Monthly* the following occurs: Over the Eastern, Middle, and Northwestern States, boulders, that have emigrated from distant points northward, occur in such abundance that they may almost anywhere be found if the inquirer will only examine the country he passes over. Upon Mount Katahdin, in the Moosehead region of Maine, stones can be seen, lying over 4,000 feet above the sea, fossiliferous in their nature, and coming from northern sites; while toward Mount Desert masses, some 40 to 50 feet in height, are sprinkled everywhere, and, as in the case of the Dedham granite distributed to the south, invariably show northern origin. In Berkshire county, Massachusetts, these traveled rocks lie in long alignments, passing over the Lenox hills, and extending in a generally southeasterly direction for 15 or 20 miles, and have been filched from the Canaan and Richmond hills across the line in New York, being of chloritic slate, with angular specimens of limestone intermixed. Some granites from Vermont, on the west of the Green mountains, have been lifted over these barriers and transferred to the southern margins of Massachusetts; while in Vermont, a boulder weighing over 3,400 tons, and known as the Green Mountain Giant, has been drifted across the valley of the Deerfield river, and planted 500 feet above that stream. In Michigan, near the Menominee river, a field upon the northern slope of a mountain is densely covered with boulders, so that a mile can be traversed without once touching the ground. Again, huge nuggets of copper, torn from the immense deposits of native copper at Keweenaw point, Portage lake, and the Ontonagon district, on the southern shore of Lake Superior, are found widely disseminated to the south of these localities in Michigan, Wisconsin, Ohio and Minnesota, a few of which have weighed 300, 800, and one 3,000 pounds.

GOOD HAUL OF FOSSIL FISH.—During the last summer vacation Prof. Edwin R. Lewis, of the Syrian Protestant college at Beirut visited a fossil fish locality on Mount Lebanon, and succeeded in getting permission to work at it. He remained about two weeks, with a number of workmen, and obtained, doubtless, the largest and finest collection ever made at the mountain. The specimens are the most superb ever seen, both of species formerly known and many new ones, thus discovered by him, besides many perfect specimens of species hitherto known only by imperfect examples or fragments. He brought away about 5,000 selected slabs, some of the slabs actually containing hundreds of specimens. The German paleo-ichthyologists express great astonishment at the results of his work, which, especially in Selachians, surpass, in their opinion, anything before known.

MONUMENT TO LINNÆUS.—It is proposed to erect at Stockholm a monument to Linnæus, consisting of a statue of the great naturalist, surrounded by allegorical figures of the four sciences to which he devoted himself, namely, botany, zoology, mineralogy and medicine.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

AMADOR.

CANAL REPAIRED.—The big break in the Amador canal, last week, near Bald Rock, which carried away 200 feet of the embankment, was repaired on Sunday. In places the soil was washed away to the depth of 30 feet. From eight to 10 men were employed nearly a week in mending the break. A substantial flume now conducts the water over the scene of the disaster, so that mishaps are not likely to occur again in that locality. The mills working by water power were shut down from Wednesday to Sunday, but everything is now moving along smoothly once more.

PENNSYLVANIA.—The new 10-stamp mill of the Pennsylvania has been crushing ore for the past two weeks. It is a very complete piece of work, fitted up with every convenience. Altogether about 200 tons of rock has been crushed, the output of gold so far reaching the gratifying figures of \$15 per ton. The mine is looking well, so much so, that 10 more stamps are to be added to the mill forthwith.

PLYMOUTH.—A great many prospectors are out prospecting up and down the creeks and gulches with more or less success. We hear of one party who has found the "color" to the amount of \$30 per week—gravel claim—about two miles north of Plymouth.

BOULDER FLAT MINING.—Amador *Dispatch*, Feb. 2: Barher & Baker have two little giants operating at full blast upon their Boulder Flat gravel claim, near the old Pioneer mill, a short distance from Volcano. There is no longer a scarcity of water with which to operate.

HOISTING WORKS COMPLETED.—The hoisting works of the Moore mine have been completed and put into operation. It works well and we may soon expect to see the mine one of the paying institutions of our county.

DITCH CONTRACT.—The contract for digging a ditch from Kennedy Flat to the Monterichard mine was let to Mr. E. Muldoon, last Tuesday, at 70 cents per rod. The ditch will be two feet wide at the top and one foot at the bottom by 18 inches deep, and will be about 280 rods long. Besides this ditch, the water will be conveyed some distance by natural channel and through iron pipe.

A GOOD YIELD.—Joseph Leduc had 50 tons of quartz, taken from his mine, a few miles east of Volcano, crushed at Mace's mill, last week, which yielded over \$1,300.

PREPARING FOR WATER.—Mr. F. Mace is having one of Knight's large sized patent water wheels put up, with which to run his saw and quartz mills, to take the place of steam power, now in use.

IRON PIPE.—Two large loads of iron pipe passed through town, last Tuesday, for Payne & Co.'s gravel claim, near Moon's ranch.

CALAVERAS.

GOOD ROCK—MINE SOLD.—Calaveras *Chronicle*, Feb. 2: Returns from the upper county, with regard to quartz mining, continue of the most favorable character. We hear that 46 tons of ore, taken from Gass & Co.'s mine and crushed in Garland's mill, at Mosquito, averaged about \$15 per ton. That is in keeping with the previous yield of the mine, which has paid steadily and largely from the outset. We understand that negotiations for the sale of the mine, which have for some time been pending, were lately closed. Taken altogether, the mining interests of the country never looked so favorable as at present.

GOLD BRICKS.—That the yield of the mines in this vicinity—both gravel and quartz—have been abundant since the rain set in is fully attested by the number and diversity of gold bricks to be seen at the office of our hanker and assayer, C. Schlund, Esq. Almost every day bars of refined gold come from the furnace, varying in weight from what constitutes a pretty good lift for a healthy organism down to diminutive ingots of the value of \$5,000 or \$6,000. We doubt if there is another county in the State now producing as much gold as Calaveras, and a large proportion of the metal passes through Mr. Schlund's hands.

MILL STARTED.—The mill at the Enterprise Con. mine, near West Point—an eight-stamp battery—was started recently and will be kept in constant operation in the future. We understand that there is about 300 tons of ore on the dumps of the mine, which, together with the daily yield, will keep the battery in uninterrupted operation.

UPPER COUNTRY JOYS.—The Champion, at West Point, is still sinking. Shaft is now 380 feet deep, the ledge showing over two feet wide. Gouldson & Smith, proprietors of the Pride of Bummerville, have struck it rich at the depth of 40 feet. Ledge about two feet wide, every pound of which will pay an average of \$45 per ton. Maunidu & Potter have discovered a new vein, about a mile from West Point, that promises well. Enterprise Con. is stopping. The mill is running. The hoisting works, for some time past in process of erection, on the Sunderland mine, at Independence, to replace those burned some time since, are completed and in operation. We understand that Garland's mill, at Mosquito, is running on San Bruno rock.

EL DORADO.

THE ROSE MINE.—El Dorado *Democrat*, Feb. 2: Work will soon be commenced on the Rose mine, just south of this city. Hoisting works

are now in course of erection, and we are told that work will be pushed right ahead. Thanks to the energy and enterprise of C. W. Brewster, Esq.

ON DIT.—That arrangements are being made to recommence work on the old Pacific mine, on the hill just south of town. This is, we think, one of the finest quartz ledges mother earth ever produced, and we sincerely hope that rumor may prove true, and that this famous old mine will be thoroughly tested. There is great wealth in the Pacific, and yet it will require considerable time and money to get at it.

THE UNIONTOWN BONANZA.—A few weeks ago, Sam Stuckslager and Nathan Plumtree, the owners of a porphyry claim near Thompson's hill, a short distance south of Uniontown, gave Oscar Oshorn and Joe Blundie permission to prospect the lead, on condition that the projectors should have half the proceeds. After working a short time a pocket was struck which promises to be one of the richest ever discovered. The quartz is of a friable character, easily broken up, and the proportion of gold is simply enormous. In one day enough rock was taken out to yield, when crushed, nearly \$15,000. The shaft has been driven to a considerable depth, but is not yet through the pocket, nor has either end been found. Mr. Lohry, merchant at Uniontown, a very reliable gentleman, who has examined the mine, estimates that there is \$250,000 worth of rock in sight. To say that the parties in interest are delighted don't half express it. Other prospectors are on the ground diligently searching for the continuation of the ledge.

THE KEENAN MINE.—A company, composed of seven of our most prominent citizens, namely, H. L. Robinson, Thomas Fraser, C. H. Weatherwax, E. F. Woodward, Dan Wickham, and John Blair, hounded the above named mine, on Friday last, for \$5,000. Some work was done on this ledge a number of years ago, and it is said to have prospected well, but for some reason work was suspended, the mine falling into the hands of Edward Keegan, Esq. Mr. Keegan refused, three years ago, ten thousand dollars in gold coin for his mine. Work was commenced at the old tunnel on Saturday last, and Superintendent Wickham informs us that he will soon have a gang of men at work on top of the hill, sinking a shaft.

INYO.

BULLION SHIPMENTS.—Coso *Mining News*, Feb. 2: The shipment of bullion from this place by Wells, Fargo & Co., were much lighter for January than for the preceding month of December. The total for January is: Emigrant M. Co., \$6,150; Sheldon M. Co., \$1,000; one bar from Minnietta Belle M. Co. (attached by John R. Hite), \$650; gold bullion by Mexicans, \$300. Total, \$8,100. The falling off is due to the extreme cold weather, by which water pipes, springs, etc., were frozen up, causing a stoppage of the mills. There will undoubtedly be a large increase the present month in fine silver bullion, and we expect to record, also, shipments of crude bullion from two or three, perhaps four, furnaces.

NEVADA.

BIG CLEAN UP.—Grass Valley *Union*, Feb. 1: We noticed, not many days ago, the fact that a rich ledge had been struck in the Centennial mine, on Oshorn hill. Since then a crushing of this rock has been made with a splendid result, which we give below. For a time the Centennial yielded richly from the vein found on the foot-wall, but as the work was continued downward the rock became poor, and the prospects were discouraging. A few weeks ago, it was discovered that the ledge was split, a portion of the vein running into the hanging wall. This was prospected and found to be very rich, and larger than the foot wall ledge, and continues to hold its good appearance, with every probability of continuing. The crushings that were taken out were partly company rock and partly tribute rock, and were as follows: 26 loads company rock, \$117 per load; 9 tribute, \$147 per load; 12 tribute, \$100 per load; and 4 tribute \$133 per load—making an aggregate of the yield from the first crushings from the new strike, of \$6,297. The hanging wall ledge varies in width from six to 10 inches, and where smallest is exceedingly rich, and would go \$250 or \$300 per ton if not mixed with the rock taken from the wider portions of the vein. The main incline is down nearly 400 feet, and this rich rock is taken from the slopes of the bottom level.

THE GRASS VALLEY NEW M. Co. have a regular ledge in their drift, 104 feet east of the incline, which is down 200 feet. The walls are regular, and it is believed now that the ledge will be permanent. Heretofore the ground has been broken up, and no regular formation was found. The ledge found is about eight inches wide, but gives indications of growing as it is drifted on. The quartz shows well in sulphurets. A good paying ledge in that ground would give great encouragement to adjoining locations. A heavy rain prevailed yesterday giving the miners another installment of water. The indications are favorable for more.

NEW ENGLAND MINE.—Nevada *Transcript*, Feb. 2: The incline of the New England mine is now down about 350 feet, and the drifts on the lower level are in, respectively, 150 and 350 feet. Two shifts of eight or nine men each are employed, and together they take out about 20 tons of rock per day. There is now about 80 tons of quartz on the dump, which it is safe to say will crush \$25 to the ton. The prospects of this mine have greatly improved of late.

THE NEW BRUNSWICK M. Co. raising rock from the same level as the New England, is

meeting with very fair success. There are now from 40 to 50 tons of good looking rock on the dump.

HUNTING A LEDGE.—The Pioneer Reduction Co. is at present engaged in sinking a "blind shaft" to tap the ledge recently hounded to that corporation by Messrs. Jones, Cashin and Morgan. It was not long since struck but a short distance from the present field of operations, and just northwest from Maltman's sulphuret works.

PIONEER REDUCTION WORKS.—The sulphuret mill of the Pioneer Reduction Works has started, and within eight or ten days the enterprise will be in full blast. They are now working the first lot of about 45 tons from the New England mine.

LITTLE YORK TOWNSHIP.—Dutch Flat *Forum*, Jan. 31: On Remington hill, the Rhode Island company have been hydraulicing for over a week. A fair head of water is being utilized to good advantage. Twenty-seven men are steadily employed in the Wide West mine. The drifts continue to look splendid, and are paying well as usual.

LOWELL HILL.—The Swamp Angel company have again resumed operations with a full force of miners. Work is progressing night and day, with 20 men employed in the drifts. The gravel taken from the breasts is said to be fully as rich as any worked heretofore. The work of advancing the various headrock tunnels in this vicinity is under continual progress.

THE LIBERTY HILL COMPANY are washing with two streams, one on the upper and the other on the lower strata. About 1,500 inches of water is used. The working of the two stratas in connection with each other proves of great advantage. The Union mine is also washing, using 800 inches of water.

LITTLE YORK.—The pipes and flumes of the Little York ditches being repaired they are now running about 1,500 inches of water, which is utilized in working the Empire and Christmas Hill mines.

A You Bet correspondent says: You Bet has taken a start again. The late rains have started the mines once more. The English company have been washing for some time at Brown's hill. They resumed washing at Red Dog on the 27th, and will be ready to turn on at the Walupa mine in the course of a week, as a shaft is being raised for that purpose. The Nevada or Hayward Co. are running two claims and will be ready to start up the third in a few days. Washing was resumed in the Hussey mine on the 28th. With nearly 100 men employed in the mines it will be seen that the prospects for a lively camp after a little are quite flattering. It is pleasant to see a change approaching so closely, as our business men have been looking very gloomy for the past few months.

PLACER.

BAKER MINE.—Dutch Flat *Forum*, Feb. 3: The Baker washes six hours a day, using 1,600 inches of water, and employing 12 men, who are kept busily engaged throughout the day in breaking holders and pulverizing cement. North Star No. 2 washes four hours a day, using 400 inches of water, and employing five men. The Franklin, through the aid of a monster derrick in removing the large holders, is making a splendid showing. Twelve men are employed, and 1,000 inches of water used four hours a day. The Polar Star and Southern Cross are utilizing 2,000 inches of water alternately, each washing six hours a day, and employing 40 men. This company expects to clear sufficient headrock in about three months to admit the working of derricks, when they will be enabled to make better progress at much less expense. Washing in the Central mine is progressing without cessation, using 700 inches of water, working two shifts, and employing seven men. No holders.

GOLD RUN.—The Gold Run Hydraulic Co. (Limited) is washing 24 hours a day, utilizing 800 inches of water, and employing 11 men. The Miners' Ditch Co., owing to a scarcity of water, is not making the contemplated progress, washing but 10 hours a day, using 1,800 inches of water, and employing 15 men.

SHADY RUN.—The Wild Yankee was enabled to resume hydraulicing last week, while hostilities on the gravel banks are progressing to good advantage. A large force of men are employed in the drifts of the North American Co. The breasts are looking splendid. Several men are employed in running tunnels in the Blue Bluffs and Hobbs Co.'s claims, two drifting mines that have been lying idle for some time. Mr. Jake Aheal is the Superintendent and principal owner of the former, and a Mr. Hohls, of Virginia City, the proprietor of the latter.

THE Ritchie mine, on Bear river, is being systematically worked under the supervision of Mr. Ritchie himself. He informs us that the mine is now paying well, last week having yielded an average of \$10 per day to the man. Since commencing work the present season the claim has paid \$4 per day to the man, which is good wages these hard times.

SHASTA.

IGOO TREMS.—Cor. Reading *Independent*, Feb. 3: We have had an unusually heavy fall of rain here for the past week. The miners now have all the water they can use. The Hard-scrabble mine is now running five Little Giants day and night, with quite a large head of surplus water running over the bank. They are now blasting out another ditch in which to put extra boxes.

SIERRA.

BRANDY CITY.—Mountain *Messenger*, Feb. 2:

J. M. Hickey informs us that he has had a good head of water in his diggings for a long time. The cold weather hothered him some, compelling him to turn the water out of some of his flumes to prevent them from freezing full of ice.

BRUSH CREEK MINE.—This mine is now fairly opened, and the mill running steadily, though we believe not on the richest rock. The shaft is down 700 feet, in a ledge about three feet in width, with well defined walls on either side. Dave Quadlin brought up a specimen of the rock, on Sunday, which is the finest piece of gold-bearing quartz we have ever seen, and we have been shown many valuable specimens in our day. The specimen weighed about two pounds and contained fully \$50 in gold. Quartz of this character is valuable for working up into jewelry, and is very scarce.

MORRISTOWN.—The late storms of snow and rain have started the water in this place, and the American company's mine, owned by J. H. Thomas, of La Porte, has been running four monitors, day and night, for the last three weeks, and the high gravel banks are fast disappearing before these large streams of water. The prospects for a good season were never better, there being now four feet of snow here and six or eight at the head of the ditch. With the usual spring storms, we will have a good mining year.

Nevada.

CORNUCOPIA DISTRICT.

THE MINES.—Cor. *Silver State*, Jan. 29: Quite a change has occurred here within a short time past. At the Leopard, Coffin has been superseded as Superintendent by George Willard. The mine is prospecting well, according to all accounts that I can get hold of, and from their own ore they will make an increased bullion shipment this month. Probably it will reach \$40,000, at least. The Hussey is now considered the boss mine of the camp, and everything goes to show that such is the fact. Ever since the new Superintendent, John Yule, took charge there, things have changed remarkably. He has developed an extensive vein of ore on the 240-ft level, which is 12 feet wide, and all good free milling ore. The first-class will work from \$200 to \$300 per ton; second-class, from \$80 to \$125 per ton, and they have an immense amount of it in sight. Teams are now delivering daily at the Leopard mill six tons of the first-class ore and 12 tons of the second-class, all of which will be worked in a short time, when Cornucopia bullion shipments will come up to about the tune of its former days.

EUREKA DISTRICT.

MINING ITEMS.—Eureka *Sentinel*, Jan. 30 to Feb. 4: The Metamoras shaft will reach a depth of 400 feet by the 1st of March. Bullion shipped during the week, \$73,000. There is over half a million bushels of coal stored at the various furnaces. A difference of \$1.50 per ton is made by the railroad company in favor of refined lead over crude bullion. The ore body in the Mortimer mine is still looking well, and quite a quantity of high-grade ore is on the dumps. The Eureka tunnel will penetrate Prospect mountain at a depth of 900 feet below the apex of that elevation. A winze and connecting upraise on the 450-ft level of the Ham-hurg mine, has followed a fine vein of ore the entire distance. The Eureka Con. company shipped \$282,100 during the month of December. The Eureka Con. company received yesterday a large hoiler, which will be set up at the mine on Ruby hill. The K K company will commence shipping bullion next week; furnace is in full blast. The daily receipts of charcoal, by team and rail, will average over 10,000 bushels. A new shaft will be sunk at the Jackson mine next spring, and it will be located in the limestone east of the present hoisting works. At Sheriff's sale, the Orange Con. mine was sold to Patrick Moran for \$3,054.22. The shaft at the Grey Eagle mine is going down rapidly, sinking through favorable ledge matter. An analysis of the vein limestone on Ruby hill shows it to contain 53% carbonate of lime, 44% carbonate of magnesia, 2% carbonate of iron, 1% of silica and a trace of alumina. Notwithstanding the daily shipments, both crude bullion and refined lead accumulate in large quantities at the Richmond works. The new double crystallizer at the refinery will soon be in working order. After this week, the regular shipments of ore from the mines on Ruby hill, over the railroad, will amount to 400 tons per day, and it will take two regular trains to do the work. The Richmond company will receive five cars of coal daily after this week. Messrs. Arrington & Bartlett are working 16 men at the Geddes & Bertrand mine. The bullion production of Eureka district, for the month of January, was a trifle over \$800,000. A gentleman who is well posted prophesies that when the Eureka mining and tunnel company's tunnel penetrates the shale a large portion of the water that runs through the K K mine will be diverted into Goodwin canyon. The machinery to be used in working the 10th level and the ground below that point, in the Eureka Con. mine, is coming rapidly to hand. Furnace No. 4 at the Eureka Con. works, will be run down and relined as soon as the repairs to No. 3 are completed.

Arizona.

CONCENTRATION.—Arizona *Citizen*, Jan. 26: Mr. J. W. Haskins, of Globe City, called at our office, one day this week, on his way to San Francisco, where he goes to purchase some of the Frue concentrators, for working the ores of the Cadmus copper mine, in Globe district. Mr. Haskins gives it as his opinion that the

proper mode of working the greater part of the ores of Arizona for some years to come is by concentration. Mr. Haskins states that the Cadmus is not the richest mine in the world, but he does think it is the largest copper ledge yet discovered on the Pacific slope. The ore will average from \$90 to \$100 per ton. The ledge is well opened, the road and buildings are built, the machinery is there and now all that is lacking is the Frue concentrators.

MORE STAMPS.—*Arizona Enterprise*, Jan. 30: The Tip-top mining company think they will shortly have to add more stamps to their new 10-stamp mill; that is, if they do much custom work. Their several claims are yielding more rich ore than the company has ever dreamed of seeing in them.

YAVAPAI COUNTY.—Humboldt district is now the most attractive one in our county. It is not to exceed 50 miles south of Prescott, on the southern slope of the Bradshaw mountains. The district is pretty well watered and has abundance of timber. Latest accounts from the district are highly encouraging. The Tip-top, Foy, Cricket, Madden, Swilling and scores of other mines are yielding abundantly of ores that assay from \$100 to \$200,000 per ton.

BRADSHAW DISTRICT is still nearer to Prescott and higher up in the mountains. It has scores of fine ledges, some of which are now being worked.

TERREY, CREEK district is this side of the Bradshaw. In it is Masterson's mill, which is kept busy working ores.

EAST of it is the Peck district, of which little need now be said, since it is a well-known fact that it contains several of the best mines now known to miners.

HASSAYAMPA district, which is about 12 miles south of Prescott, contains some fine mines. So does Big Bug, Walnut Grove, Weaver, Black Hills, and other districts, while to the north are districts of inexhaustible resources.

BESIDES all these our county contains copper, coal and salt mines that are well looking after; so, take it all in all, it would be hard to find a better or richer region than Yavapai county, Arizona, once the home of villainous Indians, but now the resting place of over 20,000 white people.

MOHAVE COUNTY.—The miners of this county are giving good accounts. The population is rapidly increasing, and will continue to do so for many years to come. Three quartz mills are kept running, and another is in process of erection.

MARICOPA COUNTY.—This county, which borders Yavapai on the south, is more of an agricultural than a mining county, still her Cave Creek, Wickenburg and other mines are wonderfully rich in gold.

PIMA and **YUMA** counties have brilliant mining futures before them. Capitalists are now paying strict attention to their resources, and the miners of both counties are highly elated.

ALL our poor mine owners have to do is to keep right along developing their ledges, and otherwise preparing them for capitalists, who are every day coming, and preparing to come. As the *S. F. MINING PRESS* has well said, we must guard against luring capital by a false showing. But there is no necessity for this, since the great majority of Arizona mines are good enough for anybody.

Utah.

BIG COTTONWOOD.—Salt Lake *Tribune*, Jan. 27: The mines of the Columbus company, consisting of the Columbus, Oregon, Taylor and Abbey, yield very nice ore, which is being stacked up. The Little Giant yields some high grade ore. The Reed & Benson ships about 10 tons of 350-ounce ore daily. About 30 teams a day are employed hauling ore down the canyon. The Carbonate mine is the same big bonanza. Ore is being shipped daily. The Osceola, under the management of A. G. Paddock, looks well and is shipping. Mr. Greenway recorder of the district, is bappy and full of business. He looks for a rousing camp in the spring. Two hundred sacks of \$65 ore were shipped from the Maxfield the other day. They are just coming on the ore body.

LEEDS.—A mill is being put up to work Barbee and Walker ores. The Rock Cliff mill is worked on Stormont and Emily Jane ores. A rich strike is reported in the Pinkham & Dodge mine. Lively times are anticipated in Leeds this season of leaching and big strikes. The Dubuck mill has started up on Tecumseh, Maggie and California ores. The Leeds company's mines, worked by Mr. Williams, continue to turn out bullion as usual.

DRY CANYON.—Times begin to look bright for Dry Canyon. The Mono has been leased to Clark, Marshall & Boyle, and started up last Thursday. Ross Hutchins is working about 60 men in the Hidden Treasure; shipping as usual. W. H. Bowers has just completed a new outfit for the Desert mine, consisting of two rock drills (Wood's pattern), an air compressor, and a double cylinder hoisting engine. This is said to be the best hoisting works in the Territory.

ALTA.—The famous Flagstaff is shipping as usual. They are now raising from the Bay City tunnel to the Emma. Ore of a high grade is being taken out of the Alpha. Alta Consolidated is worked largely and doing well. The wire tramway runs regularly.

BINGHAM.—Dunican, Burkett & Gregg have converted the Revere concentrator into leaching works and are making money fast. The sixth shipment of leached silver from old Telegraph ores was made Friday, valued at 1,200 ounces each shipment. The Fagan & Bates

mill, running on Hampton gold ores, turned out a bar of gold, valued at \$3,600. This was the first shipment and created great interest. L. B. Kinney is about to put up leaching works and a stamp mill near the mine, below the depot. There are thousands of tons of leaching ore in sight at the Revere mine. The Mayflower, Giant, Yosemite and all the old-time mines are being worked. The Revere leaching works can run through 50 tons a day, and will soon be able to work 100 tons daily. Talbot & Winans are putting up small leaching works, opposite the Dixon mine. Its capacity will be an eight-ton tank.

A Bad Idea.

A Prohibitory Tariff on Printing Material.

We learned by telegraph from Washington on Friday last that one of the amendments to the new tariff bill now before the House, was to change the proposed 20% on type, which would be a reduction of 5% from the present tariff, to a specific duty of 13 cents per pound on news and book type, or really about 50% *ad valorem*, and 30 cents per pound on job and fancy type, or from 30% to 120% *ad valorem*, according to the size and style of the letter.

This is one of the most infamous jobs ever heard of in tariff legislation and bears upon its face the handiwork of the "Type Ring." This type ring is an association of some dozen type-founders, who meet together and arrange to how great an extent they will "cinch" the printers every year. There is no competition among them, for each has his own field. They send out no travelers, solicit no orders and keep their prices just low enough to exclude foreign makers. Now, however, having found that one foreign house on this coast was taking away the trade on this coast from one of the ring, who was formerly here (and which house has been capturing this trade, not by cutting prices, but by selling a good article), they are trying to get Congress to pass a prohibitory tariff bill. This is a direct onslaught on the printers of the Pacific States, and it is the duty of every printer to bestir himself and leave no stone unturned to beat the bill.

There is one thing certain—if this outrageous bill should be passed, it will cost the printers upon this coast thousands upon thousands of dollars; whereas, should it be beaten and the existing 25% be taken off, it would put thousands of dollars into their pockets. The bill is merely framed to prevent the Scotch foundry from continuing its business upon this coast, as it is the only foreign type foundry doing business in America. These gentlemen have spent large sums of money in establishing their business in this country and pay nearly \$20,000 into the public treasury every year, while their material is admitted to be the best in the world. It is not right or fair that these gentlemen should be obliged to give up business and that the hundreds of printers on this coast and elsewhere, who have purchased their material, should be debarred from the advantages they derive through trading with them, just because some ten or a dozen type-founders, rivals in business, do not approve of it.

The only way to defeat this bill is for every publisher to write to our representatives in Congress without delay and urge them to use their influence against that portion of the proposed tariff. Let them all print in their papers their opinion of the measure and the *Mail* will republish their united vote and see that it is thus brought to the personal attention of every Senator and Representative. This, together with the influence of the numerous Eastern papers that are urging the matter, will surely have the effect of defeating it, for we cannot imagine that any Congressman understanding it, would for one instant favor, far less give it his vote.—*Mail*.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

STILES HERCULES ENGINE MANUFACTURING Co.—Feb. 5th. Capital stock, \$100,000. Directors—W. C. Stiles, J. M. Hixon, E. P. Marcellus, H. H. Pearson and J. L. Boone.

REDWOOD LUMBER ASSOCIATION.—Feb. 4. Capital stock, 150,000. Directors—H. F. Tibbott, John A. Hooper, Henry Wetherbee, J. B. Ford, John Dolheer, John Kentfield and J. G. Jackson.

ORIENTAL CON. G. & S. M. Co.—Location: Sierra county. Capital stock, \$2,500,000. Directors, H. H. Bissel, W. Mulroy, W. R. Mould, R. B. Mulroy and T. H. Smith.

ALTAR G. & S. M. Co.—Feb. 7th. Location: Mexico. Capital stock, \$10,000,000. Directors—F. V. Webster, F. K. Webster, W. B. Wilshire, J. G. Whitney and F. A. McGee.

INO PLUMBAGO M. & MFC. Co.—Feb. 4th. Capital stock, \$1,000,000. Directors—J. Hirschfeld, C. Westphal, G. Cane and J. M. Buffington.

PINAL M. & M. Co.—Feb. 4th. Location: Arizona. Capital stock, \$60,000. Directors—M. A. Baldwin, A. Roberts, E. W. Peet, L. T. Carr and C. E. Boyce.

Gov. IRWIN has ordered a special election for the 14th instant, to fill the vacancy in the State Senate caused by the death of Senator Angney, of Santa Clara county. Whoever may be elected will have (not excluding Sundays) about 47 days to serve.

News in Brief.

The steamer *Metropolis*, was wrecked on the 31st ult., and 150 lives lost.

They have been having severe storms in the Eastern States.

The public debt was decreased last month by \$1,668,076.

There were 300 arrests in New York on Sunday for violation of the Excise law.

The Chicago Academy of Music was burned on the 4th inst.

Austria and Serbia are not satisfied with the peace preliminaries.

The rebellion at Capetown is believed to be over, the insurgents having been defeated.

The German corvette *Elizabeth*, 18 guns, is expected here from Japan waters, en route for Central America.

An asylum for women and children at Tientsin has been burned, and over 2,000 persons perished in the fire.

The Legislative Committee to investigate the matter of the labor movement in this city has been in session during the week.

The steamer *Pelican* has been sold to parties in Central America, and will be turned into a gunboat.

The Central Branch Union Pacific railroad is now running regular trains to Conchordia, 155 miles west of Atchison.

Every preparation is being made to close the sound and approaches to Copenhagen with torpedoes, in 24 hours if necessary.

A number of coasting vessels are overdue at this port and a revenue cutter has gone in search of them.

O'LEARY completed his 400 mile walk in Cincinnati at 10:15 o'clock Saturday night, an hour and 45 minutes ahead of time.

NINE MILLIONS of people are reported destitute in Northern China. The Foreign Relief Committee appeals to England and America for aid.

TWENTY THOUSAND tons of lead were produced in Nevada last year, nearly one-third of the total production of the United States.

The suit of Hall vs. Truworthy, for infringement of patent on rubber type marking wheels, was decided in the United States District Court in favor of the plaintiff.

A SITE has been chosen for the Cleopatra obelisk on the Thames embankment, at the top of the Adelphi steps, between Charing Cross and Waterloo bridges.

The British war vessels *Albatross*, *Amethyst* and *Fantome*, of the Pacific, have been ordered home to be paid off and go out of commission.

In consequence of the armistice, the garrison at Widin has been ordered from Constantinople to surrender their arms, after which they will be quartered in neighboring villages.

CAPT. TINKLEPAUGH, long known to California travelers as a steamer commander between here and Aspinwall, died recently of pneumonia, aged 68 years.

ALL the wheat vessels which cleared from this port in July and August last have arrived out, except one. Three of the September vessels have arrived out. There are only 59 cargoes afloat.

The passenger arrivals by sea from foreign ports at San Francisco last month numbered 1,022, and the departures 689. The movement was unusually light both ways. There were 600 from China and Japan, against 288 departures to those countries.

FORTY THOUSAND bids have been received for carrying mails during the next four years in nearly all that portion of the United States lying west of the Mississippi river, and extending to the Pacific ocean. Awards will be made by March 30th.

EIGHT cargoes of wheat, aggregating 297,700 centals, and valued at \$699,800, were cleared from this port last month. Since July last we have cleared 72 wheat vessels, carrying 2,746,700 centals, valued at \$6,441,800. During the corresponding period in the previous season we exported 255 cargoes of wheat and flour.

The Secretary of the Treasury will not open the Mint at Philadelphia for the coinage of trade dollars, and will place such restrictions on Western Mints as will prevent their coinage for shipment East. Coinage of sufficient amount to meet the actual demand for export will be authorized for the present, or until Congress shall have acted upon the coinage of the silver dollar for circulation.

EIGHT hundred of the Red Cloud Indians have left the agency, going north. The Indians assert that all the fighting bucks at that agency will cut loose early in the spring and follow the general northward trail. Spotted Tail Indians are secretly buying fat ponies, and making other suspicious moves.

The bill agreed upon by the House Committee on Pacific railroads for the benefit of the Northern Pacific railroad extends the time of its completion ten years and reduces the land grants in Washington Territory, taking away such portion of the land as was before embraced in the appropriation for the construction of the road from Pen d'Oreille to Puget sound.

A BILL has been introduced in Congress providing for the incorporation of a company to build a railroad from Cheyenne, thence to Fort Laramie, where the road divides, one fork going to Deadwood, and one to Fort Fetterman, thence to the Yellowstone river at the mouth of the Big Horn, and thence by Helena to the Pacific ocean, with such other branches as may be deemed necessary. No land grant is given but the usual right of way and land for engine-shops, etc.

AN official investigation of the loss of the *Metropolis* has been ordered.

POPE PIUS IX died at the Vatican, Rome, on Thursday afternoon.

THERE have been some fatal snow slides in Utah within the past week.

GEORGE CRICKSHANK, the well-known draughtsman and caricaturist, is dead—aged 84.

J. R. DODGE, Statistician of the Department of Agriculture, will probably retire from that position.

The House Committee on Education and Labor is considering the various measures proposed to restrict Chinese immigration.

The Library Committee of the Senate and House have agreed to ask the appointment of a Commissioner to consider the matter of building an extension to the Congressional Library.

The deaths recorded at the Health Office last week numbered 94, against 101 the preceeding seven days. The average of the corresponding weeks for five years past is 95.

ALL of the old and long established physicians in this city have fallen into the good practice of giving medical attendance to the poor free of charge, devoting a large portion of the day to this work of charity.

The St. Petersburg *Vedomosti* calculates that after the conclusion of peace the Black sea and Sea of Azof ports will export 5,000,000 quarters of wheat.

The great storm in the East nearly devastated Coney island, in New York harbor. There was great destruction of property at Long Branch, and along the coast elsewhere.

The Union Mutual Insurance Company, one of the oldest marine companies in New York city, announces its intention to retire from business. Cause, too large reductions of premiums and shrinkage.

FOLLOWING is a statement of coinage executed at the United States Mints in January, 1878: Value of gold coinage, \$7,446,000; trade dollars, \$1,391,300; fractional silver, \$907,810; minor, \$11,336.

THE Assembly has adopted a concurrent resolution calling on the Joint Committee on the Constitutional Convention to report on or before the 15th instant a bill calling for a Constitutional Convention.

GEN. SUTTER, the discoverer of gold in California, is in Washington, and has been granted a hearing by the House Committee in favor of his claim of \$50,000, that has been so long pending in Congress.

THE roof of a large building known as the furnace house of the New England Glass Manufacturing Company, East Cambridge, fell in on the 3d instant, with a terrific crash. The roof was of iron, 100 feet long, by 90 feet wide, and was constructed in 1861, at a cost of \$18,000. There was no snow on the roof, and the cause of its fall is attributed to contraction of the metal by cold.

COL. PURDY, son of ex-Gov. Purdy, of California, has just been promoted by the Khedive of Egypt from the grade of Bey to that of Pasha. During the late war Col. Purdy was Assistant Adjutant-General upon Gen. Franklin's staff. He accompanied Gen. Stone to Egypt, but recently returned to Cairo after an absence of 18 months, in command of an expedition for scientific purposes.

THE Hinkley Locomotive Works, of Philadelphia, have suspended. Liabilities, about \$300,000; half of the paper held by Boston banks. The property of the company is assessed for \$350,000. Fifty thousand dollars is required to tide over existing trouble, and a committee of creditors has been appointed to consider what course to pursue.

GLoucester fishery vessels bring intelligence of the almost total failure of the fishery, owing to the determined hostility of the New Foundland fishermen. The action of the New Foundlanders will result in large pecuniary loss to Gloucester, and steps have been taken for laying the matter before the Government at Washington.

GEN. MILES, under date of 25th ult., reports, from Tongue river, that the main body of his command has taken the field, and he only waits for 150 recruits from Fort Snelling before proceeding in person against Sitting Bull, who, he confidently believes, is in United States territory. His force will operate from Fort Peck as a central point.

The State Department has been requested by Samoan representatives in Washington to send a war vessel to the Island of Samoa, and Evans has referred the matter to the Navy Department. The *Tuscarora*, which is in San Francisco for repairs, has been detained by orders, and will probably be sent out to the islands. The treaty of friendship and amity ratified by the Senate last week causes the request.

RAILROAD SALE.—The largest and most profitable railroad in the world—the East India, from Calcutta to Juhulpore and Delhi—will be sold early in 1879, and the Indian office is already provided for it. The first 25 years of its existence have expired, when under the conditions of its incorporation, the Secretary of State has the option of taking it at cost price. The capital is £30,500,000, and the annual dividend has reached nearly 7%, while the working expenses are lower than on any other line. As the government guarantees 5% on the capital, and advanced not a little in the earlier years of the railway's history, the account is somewhat complicated, and the interest involved, alike to the country and the shareholders, are of some magnitude.

THE ENGINEER.

Mr. Eads' Success.

The Secretary of War received, January 8th, the report of Col. G. Barnard and Lieut.-Col. H. G. Wright, of the Corps of Engineers, designated by him as a board to proceed to Port Eads, Louisiana, and make a personal and thorough examination of the work now in progress under the direction of Capt. Eads, for the improvement of the south pass of the Mississippi. The report sets forth that there has been secured through the south pass of the Mississippi river to deep water in the Gulf of Mexico, a depth of 22 feet of water in a channel not less than 200 feet in width, which entitles Captain Eads to the second installment under the act of Congress. The Secretary, in speaking of the appointment of this board, said that it was simply intended to verify the reports of Capt. Brown, and at the same time to solve some doubts he entertained as to the precise methods by which these results have been obtained; whether the action of the jetties and auxiliary works and the forces of nature thus brought to bear, or by the use of a dredge. The report of the board removed all doubts on this point, as it was shown that the operations of the dredge were essential to the success of the work only in its incipient stages. The Secretary now awaits the arrival of Capt. Eads, and as soon as he presents his claim in due form, a requisition on the Treasury for \$500,000, the second installment, will be issued to him.

MONCRIEFF SYSTEM OF MOUNTING ARTILLERY.

In the improvement of his system, Col. Moncrieff has had recourse to the assistance afforded by water and compressed air. This application, says *Iron*, has been worked out and embodied in a hydro-pneumatic gun carriage, which has recently been successfully tried at the engineering works of Messrs. Eastons & Anderson, the manufacturers of the carriage, at Erith. In order to test the principle, a carriage of this pattern was ordered by the government. The advantage of having some such carriage was long since pointed out by the committee on high-angle firing. Subsequently, and as one result of the Eastbourne experiments, the committee on siege-gun carriages recommended the introduction of a carriage possessing such attributes. Hence the present action of the war department, which has lent a 64-pounder gun for the purpose of testing the new principle. They have also supplied the ammunition for the experiments, the charge being 12 pounds of powder and a 64-pound shell. The gun is supported in firing position on levers, supplemented by a ram working in a cylinder which is in communication with a vessel, the upper part of which is filled with compressed air, the lower portion containing water. The air has an initial pressure given it sufficient to raise the gun. When the gun is fired the energy of the recoil drives the ram down into the cylinder, forcing the water up into the air vessel, thus further compressing the air. A self-acting valve prevents the water from returning after the recoil has been completed. When the gun has been loaded behind the protecting parapet, a valve is opened, and the water allowed to flow into the cylinder. The air-pressure is thus brought to act on the ram, which at once raises the gun into firing position. The present carriage is experimental.

THE CONTINENTAL OIL BELT.—A correspondent of the *Parker Daily*, who has been traveling through the Kentucky region, writes that the Great Southern Oil Works, at Louisville, have been turning out daily about 400 barrels of refined oil, and in connection with other refineries at Glasgow and Barkville, Ky., and Brownsville, Tenn., supplies most of the Southern markets. The correspondent says the Kentucky fields are now yielding quite sufficient for the Southern trade. Those regions, he adds, are now attracting much attention, and are regarded as second only in importance to those of Pennsylvania. He represents that near McMinnville, in Warren county, oil is incessantly thrown out in small quantities, and the roar of escaping gas can be heard for a great distance. Also notes the fact that in 1865 a well put down on Crocus creek yielded 1,000 barrels a day while flowing, and remained a 200 barrel pumper for a long time. The belt is said to be traced through the western corners of Kentucky and Tennessee into the Ozark mountains of Arkansas, where petroleum was found many years ago, thence passing through a corner of Indian Territory and Texas, and on, presumably, through New Mexico and Arizona to southern California.

NEW STYLE OF RAILWAY TIES.—The *Railway Age*, says that cast iron ties with wooden blocks fitting into sockets under the rails to give the needed elasticity, are being tried on the Cincinnati, Hamilton & Dayton railroad. It is claimed by the inventor that they are more economical, safer, enable the track to be kept more easily in repair and make it more solid than the wooden tie. There is room for improvement in the present expensive method of supporting rails, and it will become more urgent as the timber supply of the country diminishes, unless indeed the work of planting timber specially for ties, so strongly urged in this paper from time to time, shall be largely undertaken. The result of the various experiments with iron ties now going on in this and other countries will be awaited with interest.

CENTRAL ASIAN RAILWAY.—It is said that the great Russian project of the Central Asian railway is to be consummated. The road commences at Moscow, and is already fully completed to Samara, on the Volga, through Lower Novgorod, a distance of some 600 miles. Running southeastwardly from Novgorod, through Samara, it reaches Orenburg, on the Ural river, 600 miles, then follows a curve of that river due east to Orsk, which is 150 miles east from Orenburg, 300 south from Ekaterinburg, and 600 from the Caspian by the winding of the Ural. This is the termination of the European and the beginning of the Central Asiatic road, about which vast enterprise so much has been said for so long a time past. From Orsk, the line is southeastward to Tashkent, in Kokhan, about 800 miles—through swamps and deserts, over mountains and rivers, which require enormous bridging, tunnelling, piling and excavating, and thence eventually into Cashgar, where an intersection is made with the contemplated road from Ormus, in the Gulf of Persia, which, crossing Afghanistan into Cashgar, is aimed toward Peking. The route runs a little north of that originally devised in Eastern Europe, and east of that formerly outlined in Western Asia, and is justly spoken of as one of the greatest material enterprises yet undertaken by man.

A CHEERING PICTURE.—The *North American*, says: "That all the insurance and banking

LONDON SIDEWALKS.—The city of London claims to possess the most scientifically constructed sidewalks in the world. The method pursued is, first, to carefully grade the ground, sometimes using concrete to secure a firm foundation where the soil is too soft, but generally sand spread over the leveled ground is sufficient. The curbing is made of roughly "pencil-hammered" gray granite, 12 inches wide on the top and six inches high. Besides this run the gutters draining the roadway. The flagging is generally from three to four and a half inch in thickness. The edges are chiseled, not elaborately, but so that when the flagging begins to wear away, under the continuous traffic the joint will remain good until it is threadbare, if ever it is allowed to remain long enough to get into that condition. A liberal allowance of mortar is thrown down on the sand in which to bed the stones; the latter are placed together closely, the joints being not more than a quarter of an inch apart and well filled with binding and hardening cement. The surface of the flags are machine-dressed or rubbed, so that they always meet evenly at the joints. The rough stones are brought to the streets that are to be paved and are stacked in piles, from which the pavers take them, preparing the edges with wonderful rapidity. The stones are broken quickly, neatly and with little waste of material. A line is drawn on the face where a break is required; this is "strummed" in with a pitch-

California Fan Palm.

The California fan palm (*Prichardia filifera*; *Bahea filamentosa*) is a native of California and is found along the Colorado river and in some places in the desert in San Diego county. Several Eastern and foreign periodicals and horticultural papers have given illustrations of this palm, but none of them came anywhere near its natural structure. The cut we give above is taken from a photograph from a plant only three years old, grown by John Rock, the well-known nurseryman of San Jose. The seed was sown on the 15th of February, 1875, and the plant stands now three feet ten inches high. The objection to palms has always been their slow growth; taking a long time to make a showy plant. Often people have planted the Australian cabbage palm (*Corypha Australis*), the most common one found in nurseries, and after a few years nursing they have thrown them out because they would not make any headway in growth. About 20 years ago a lot of seed of this palm was brought to San Jose and Louis Grevest, the pioneer nurseryman, cultivated them and raised about 50 plants. These were distributed over the State, most of them having grown into specimens of 20 and 30 feet of height.

Gov. Latham, of this city, bought two in San Jose, which stood, at the time of purchase, about 25 feet in height, for the handsome sum of \$1,000. These he moved to Menlo Park, a distance of 18 miles. Many doubted their ever growing, but they have done finely. They stand now 30 feet in height and are 2½ feet in diameter, crowned with a head of fan leaves. They stand in front of a magnificent residence, on an open lawn, and present a most beautiful aspect.

Mr. Grant I. Taggart, of Oakland, informs us that two of this species of palm are growing at Shasta on the premises of W. E. Hopping, County Judge of Shasta county. They were planted some 20 years ago, they have immense trunks from three to four feet in diameter. This must be about as far north as palms were ever cultivated in the open ground. At Shasta the ground is often covered with two feet of snow. This is another proof of the hardiness of this palm.

The California fan palm is most distinct of all palms, having fine thread hanging down from its leaves. It will be very valuable as an ornamental plant in all subtropical climates, being the fastest grower and hardiest of all palms. Not until the last three years has its native place been known, but upon the completion of the S. P. R. R., they were found along its line, and even whole carloads of large plants were brought to San Francisco and sold. They may be now had almost at any nursery at a reasonable figure.

The New Regent.

Governor Irwin has appointed Mr. John L. Beard, of Alameda county, a member of the Board of Regents of the State University. The appointment is one fit to be made and in which our readers will feel much interest. Mr. Beard is a practical farmer, in the full vigor of early manhood, well educated, both in the schools of learning and of practical experience and observation. He is a believer in progressive ideas, but not radical nor visionary. His accession to the Board of Regents will lead to the representation in that body of several elements which have hitherto been unrepresented. One of these comprises the graduates of the institution and its progenitor the old College of California. It was chiefly in respect to the desires of this class for representation that Mr. Beard was selected. As a representative also of the agricultural interest of the State, Mr. Beard will find opportunity for earnest and devoted effort, and we are confident that he has both will and quality to make it.

John L. Beard is a son of E. L. Beard, Esq., of Mission San Jose, one of the pioneer agriculturists of the State. He was born in Indiana in 1845 and came to Alameda county in 1850. He graduated at the College of California in 1868 and began the management of his farm before he finished his college studies. The better part of two years after graduation he passed in travel in the Eastern States and in Europe, and made good use of his opportunities for observation. In 1870 he settled down to the pursuit of agriculture and is now farming about 700 acres in two farms, one near Centerville and the other near Harrisburg, in Alameda county. He has been successful in his farming operations and has taken a leading part in irrigation and other enterprises for the good of his own interests and those of his neighborhood. He has the confidence and good will of the many who know him throughout the State, and will take pride in such counsels and actions as shall truly advance the interests and usefulness of the University. We wish him all success in this work.

BOOKS PUBLISHED IN 1877 IN ENGLAND.—It appears that of 3,049 publications and 2,046 new editions, the books on political and social economy, trade and commerce, were 123 new works and 66 new editions. Books on art, science and illustrated works numbered 125 new publications and 64 new editions.



THE CALIFORNIA FAN PALM—*Prichardia Filifera*.

institutions of Philadelphia, have been untouched and are sound if not lucrative; that with the great depression in railway property everywhere, nearly all of that in this State has appreciated in value; that despite the unprecedented dullness of the coal trade, we have mined more than ever before; that our iron interests have really lost but little; that more tonnage is being built on the Delaware than ever; that the over-production of oil alone has interfered with its profits; that the wholesale trade of this city has steadily augmented; that our foreign trade is growing by new routes and the better patronage of old, and that in this city almost a thousand new building permits were issued last year after the unprecedented construction to meet the Centennial; while the various factories and mills, reducing their expenses bold their course in anticipation of the dawn that never fails strength, wisdom and courage.

THE SAHARA PROJECT AGAIN.—The project of converting a part of the great desert of Africa into a highway for commerce by reopening a channel which once connected it with the Atlantic ocean, is still being advocated in England. The great plain or hollow in the desert is said to be about 500 miles long and about 120 miles wide, with a depression of some 200 feet below the sea level. By letting in the sea, vessels would be able to penetrate into the heart of Africa, whose rich and varied products would thus be brought within easy reach of the civilized world.

ing tool or nicker, the edges being also strummed in; then the stone is smartly struck on the back with a round face hammer, three blows generally breaking it neatly down the line. Almost any kind of thin stone can, it is stated, be broken in this way without the use of either wedges or plugs.

A NEW OVERLAND PROJECT.—A Washington dispatch, dated January 2d, says: A new Pacific railroad bill will be presented as soon as Congress reassembles. The eastern terminus is to be at Memphis, thereby forming connections with present railroad facilities to all points north, east and south. Westerly the proposed railroad will pass Lake City to Jefferson, Texas, thence by the International and Great Northern Railroad to San Antonio, thence in a northwesterly direction to El Paso del Norte, to connect with any road or roads to the Pacific ocean now or hereafter to be built, thus affording communication with the various military posts on those lines and the valley of the Rio Grande. The projectors of the road ask for \$13,000,000 in all, to be refunded to the Government as rapidly as the money may be earned by the transportation of mails and Government supplies. One of the arguments used by the friends of the railroad is that it will be an important means of removing troops to suppress disturbances on the Rio Grande and elsewhere.

KEELY's motor cost the investors \$200,000, and Keely nothing.

Mining Safeties.

All sorts of devices in the way of safety arrangements have from time to time been suggested or brought into practical application, to obviate as far as possible the frightful and costly accidents occurring and liable to occur in the working of our mines. Some of these devices have on trial been found to possess practical merit, consequently were adopted, while others have been quietly dropped as impracticable. One of the commonest of fatal accidents in times past has been that of a carman inadvertently running his car into the shaft and immediately following it in its swift downward career to destruction in the depths. Effectual devices and precautions have been by degrees adopted, until now that style of accident is heard of no more. A dog falling accidentally down a shaft suggested the idea of a grating which would be carried upward by the ascending cage and replaced in its descent, leaving the shaft always protected, either by the cage or the grating, unless both cage and grating were carried upward "into the sheaves."

Various devices have been suggested and tried for automatically disconnecting the cable at such a critical time, when this regular and well-tried safety attachments in general use would immediately prevent any drop of the cage. Among the first was that of the pilot-driver, the elevating clamps of which are opened and disconnected, like pincers, as it were, by the upper portion or handles, so to speak, striking against the top of the hoisting frame. The latest device brought under our observation is that of Mr. C. W. Laue, of Gold Hill, which was simply a projecting arm or cam which would catch against a beam at the top of the hoisting frame, instantly disconnecting the link of the cable. The cage was left for the regular and unfailing safety attachments to take care of, while the flying end of the cable should go after the culpable engineer. It has been practically tried and found to work well, but the principal objection consists in its liability to be disconnected by anything falling, or accidental collision with some unlooked for object. Doubling or quadrupling this or the pilot-driver arrangement, however, would make them far more secure, if not entirely safe. Another device at one time employed at the Imperial-Empire shaft was that of "chairs," placed in the side guides, below the sheaves, which would catch and hold the cage when hoisted too high. This was well enough if the cable did not pull the cage overboard or to pieces.

Right here we wish to offer a little suggestion of our own. In place of the "chairs" just mentioned let there be a movable platform, fast at the sides, but opening in the middle, like folding doors, with a hole between, in the middle, for the cable to run through. This folding platform should be made of greater width than the bottom of the cage, rendering a direct drop down the shaft impossible, even were the cage pulled to pieces. Moreover, the cable connection might be so arranged as to be square and promptly parted in passing over the sheave, as a stick is broken across one's knee. We respectfully submit the foregoing idea to Col. Fair, the acknowledged old chief Superintendent of the Comstock, who always has an eye to the practical and effective in such things, and also to Superintendent Frank Thayer, of the Julia, whose mechanical genius and experience is well known and established. Here now is a fine opportunity for some good practical mechanical head to distinguish itself in obviating the terrors and dangers of "Brown's station."—*Gold Hill News.*

Mining Industry in Oregon.

From the signs of the times it is quite apparent that the quartz mines of Oregon will be brought to the front, and that the gold and silver products will create a reputation for the State as the wheat, wool and salmon products have already done. Many of our leading citizens are now interesting themselves in the development of mines. The capital and labor expended the past year on the silver mines of Grant county have established their richness and extent beyond a question of doubt and stimulated public attention to that extent that before another year a busy mining camp, with mills, machinery and the appliances for the reduction of ores, will be at work, and gold and silver bars will be regularly received at Portland. Much has been said and written in regard to the evils of stock speculations, and, doubtless with good reason; yet there is a wide discrimination between the investment of money in developing the wealth of a mine or simply speculating upon the manipulation of mining stocks. The investment of means for the opening of a mine which prospects well is more of the character of investment in real estate in a growing city.—*Oregon Sentinel.*

THE SULPHUR MINES.—Alex. Wise, just in from the Rabbit Hole sulphur mine, informs us that the California & Nevada Sulphur Company are carrying on work systematically at the mines under the Superintendency of C. S. Oehorn, and making the business pay handsomely. Mr. Wise's teams are engaged in hauling sulphur from the mines to Humboldt house, from which point it is shipped to market by rail. He delivers 20 tons every five days regularly at the railroad. The California & Nevada Sulphur Company is a new corporation, which has bought out one or more of the mines and are working them in a business like manner.—*Silver State.*

USEFUL INFORMATION.

How Varnish is Made.

In the manufacture of oil varnish, says the *Polytechnic*, the most lustrous and durable of their kind, a resin, oil and spirits of turpentine are employed. The gums are carefully assorted in the factory into sorts of greater or inferior purity and clearness; and the oil and turpentine are taken generally from large settling tanks in which they have been kept undisturbed for some weeks to free them from all impurities and to improve their qualities. The procedure of their manufacture may be described as follows: The carefully selected gum is first fused over a slow fire, with constant stirring to prevent its adhesion to the sides and bottom of the melting pot, and consequent scorching. When properly melted the necessary quantity of oil is added to it. This quantity is estimated largely by experience, but can be determined to a nicety by transferring from time to time a drop of the mixture upon a glass plate, on which it is allowed to cool, and testing its ability to be penetrated by the nail without cracking; when this condition has been reached the quantity of oil added is sufficient. The mixture is then gradually heated and thoroughly mixed. This completed, it is removed from the fire, allowed to cool somewhat, and the turpentine added under constant stirring to the still hot and liquid mixture. It is important that this last operation shall be conducted at the right temperature, for if the mixture is too hot, too much of the turpentine will be lost by evaporation; while if too cool, it will be too viscous or sticky to permit of the proper incorporation of the turpentine. When the incorporation of the turpentine is effected the varnish is practically made, the succeeding operations being filtration, which is done while the mixture is still hot, and the clarification or ripening, which is effected in large settling tanks, from which, after the proper time has elapsed, it is drawn off into the vessels in which it finds its way to the market. In these several operations, the greatest precaution must be taken to avoid the accident of the ingredients taking fire, an occurrence that might be attended with serious consequences.

PAINTING THE HOURS ON METAL DIALS.—A Swiss watchmaker's journal says the principal ingredient is soot, which is obtained by holding a clean copper or sheet metal plate over the flame of an oil or petroleum lamp (a glowing tool serves the purpose very well). As soon as a sufficient deposit is produced it is collected on a piece of glass, care being taken not to mix any foreign substance with it. A few drops of essence of lavender are then poured on the soot and the mixture pounded with a spatula. This done, just sufficient copal varnish is added to give the composition a proper thickness, so as to prevent its spreading when applied. The varnish thus prepared is put on by means of a very fine brush. To secure brilliancy the dial is dried at a slow heat, by passing it lightly over a spirit flame, the reverse side of the dial being, of course, the only part exposed to the flame. This composition must be made in quantities large enough for present use only, as it dries very rapidly and cannot be utilized afterwards. To secure good results this process requires some experience, which can only be obtained by careful experiments. The painting especially requires a certain aptitude and lightness of hand, which may, however, soon be attained by strict attention.

FOREIGN SUBSTANCES IN RAW SUGAR.—In the course of an interesting lecture "On the Impurities in Raw Sugar," lately delivered at Greenock, England, Mr. Neill, a sugar refiner of that place, displayed a number of "foreign" impurities imported in sugar, such as a crowbar, brickbats, stones, a piece of volcanic mud, an old stirrup, a Chinese head-dress, and other articles of dress worn by the workers on the plantations and at the shipping ports, and which found their way into the hogsheads and bags through carelessness, and sometimes to make up weight for sugar that had been stolen. Mr. Neill said he knew a Greenock refiner obtain no less than three tons of stones out of one cargo of sugar. One of the chief impurities in sugar was sand, and in Mauritius sugar there was found 1½% of that substance.

PAY YOUR DEBTS.—Clean hands in matters of money among the young certainly ought to be the indispensable condition of gentlemanliness. No man who borrows and does not pay, and does not care whether he pays or not, is a gentleman, no matter how witty, or gay, or fine he may be. To speak in good plain English, the man who dresses himself at another's expense, not knowing how to pay, not caring whether he pays, is a genteel scoundrel! And yet such things are done by good-natured folks, by kind-hearted people, by persons who never probe them morally to ascertain what their tendency is, and what they lead to.

LOOSE STOPPERS.—To prevent tincture stoppers from becoming gummed into the neck of the bottle, Mr. Hans M. Wilder recommends a slight coating of paraffine to the stoppers and in the neck of the bottle. This can be best accomplished by rubbing the stoppers with a piece of paraffine and giving them a turn in the neck of the bottle, so as to distribute a thin coating all over.

Making Soap in Closed Boilers.

A writer in the *Polytechnic Review* calls attention to an improvement in soap making devised by Mr. E. H. Gibbs, which consists essentially in introducing the ingredients into a strong closed vessel or boiler, and subjecting them therein to the effects of a high temperature and pressure, the intermixtures of the ingredients being secured by mechanical agitation. In this manner, and with a very simple apparatus, the process of saponification is effected with great rapidity and economy, and it is claimed, with far more thoroughness, and, as the glycerine remains incorporated with the product, without this waste, that attends ordinary operation with this open kettle.

The apparatus employed in this process consists of a cylindrical steam boiler, through the center of which passes a shaft provided with wings or other suitable devices. This shaft set in motion either by hand or by power, according to the size of the boiler, serves to keep the charge in constant agitation during the operation of saponification, and thus to insure the complete intermixture and contact of the ingredients.

The boiler is charged through a hopper with the ingredients, grease, tallow, or oil, alkali, resin, etc., in the usual proportions, and the boiler being fired, the charge is subjected, under constant agitation, to a pressure of from 120 to 150 pounds per square inch, which is found to effect the complete decomposition of the fatty matter and its saponification in the space of six hours. With a boiler 30 inches in diameter and 11 feet long, it is affirmed that 2,000 pounds of soap can be made and put in the frames in three hours, so that where four runs per day are made from one of these boilers, which we are informed can be done in case of necessity, (three runs daily being the average), the apparatus will make as much soap as 24 boilers of the same size would by the ordinary process with the open kettle.

CALCULATION RELATIVE TO WATCHES.—The balance of a watch beats five vibrations per second, 300 per minute, 18,000 per hour, 432,000 per day, 157,776,700 per year (365 days, 5 hours, 49 minutes). If a watch should go for a century, as sometimes is the case, its balance would execute 15,778,470,000 vibrations. To give an idea of the magnitude of this number, a thousand million minutes have not elapsed since the commencement of the Christian era. How many individuals carry their watches three, four, five years and more without ever having them cleaned. If we take, say five years, the watch will have produced 788,923,000 vibrations, and people expect their watches, after this enormous work, to correctly indicate the hour, minute and second. If watch-wearers reflected a little they might be somewhat less exacting towards the watchmakers.

TIMBER LANDS.—The House Committee on Public Lands last week, heard all the Territorial delegates in advocacy of their various bills for the sale of timber lands. The Commissioner of the General Land Office was also present, at the instance of the Committee, and explained and advocated the recommendations on this subject contained in his last annual report. The prospects are that the Committee will report for passage a general measure, in accordance with Commissioner Williamson's recommendations, the main features of which are embodied in the bill introduced by Pacheco, now before them.

GOOD HEALTH.

The Physician.

The following is a translation of an epigram written by Cordus in the sixteenth century:

The physician like an angel seems,
When he in the sick-room brightly beams;
And like unto a god is he,
When he's removed the malady.
But in a different light we view
The Doctor when his bill is due;
Our altered eyes we at him level,
As though he were the very devil.

HEAT OF THE BRAIN.—M. Broca has recently laid before the French Medical Association some curious facts concerning the temperature of different parts of the skull. By numerous experiments he has found that while at rest the temperature of the surface of the head is 2° Fahr. higher on the left side than on the right. When the brain is active, equilibrium is established. When continuous but moderate mental effort has been maintained for ten minutes the temperature is raised about 1° Fahr. The temperatures of the frontal, temporal, and occipital regions of the skull are also different, that of the frontal region being more than 4° Fahr. higher than that of the occipital.

MORPHINISM.—This name, says the *Druggists' Advertiser*, is given to a new form of vice, which seems to be increasing. The vicious indulgence consists in the hypodermic administration of morphia for the sake of the stimulating effects produced. The evil results are numerous and distressing, but they are almost entirely removed for the time by the administration of a new dose of the drug. The habit or desire grows by indulgence and at last leaves the patient in a state but little better than insanity.

THE INFLUENCE OF FORESTS ON THE ATMOSPHERE.—M. Faurat has communicated to the Paris Academy of Sciences the results of his thermometric observations during the past year on the influence of forests on this climate, and their general tenor, as detailed below, appears to bear out his earlier studies in 1876 and 1875. The London *Farmer* gives the following summary of his conclusions: During the progress of vegetation in June, July and August, a tree in full leaf, imbuing its nourishment from the atmosphere, produces a movement which is reflected in the air by a slight decrease of temperature. During the daytime a rise of temperature can always be noticed above fir trees, owing to this solar heat retained by the vapors which surround the tops of the trees. It is to this moist and warm medium that the vigorous vegetation of resinous trees in poor soils must be ascribed. From concurrent thermometric observations made in forests and away from them, at 1.40 and at 14 meters above the ground level, M. Faurat arrives at the following conclusions: In consequence of the differences of temperature which are observed underneath the foliage and above the summits of trees, a current of air from below upwards is established in forests, and also lateral currents around woods from the foliage towards the open space beyond. These currents cause a healthy breeze in hot weather. The ascending current carries off above the forests the vapors from the soil, puts this latter in communication with the clouds, and fills the office of a lightning conductor; and it is to this, no doubt, that forests owe their remarkable property of keeping hailstorms at a distance.

OUR DIGESTIONS.—When proper, natural, simple food is taken into the healthy stomach, no more is felt of it. If it be of the nature of soup or beef tea, it is absorbed, as it were, by the coats and veins of the stomach. If it be meat, it is, by the movement of the stomach, carried round and round its cavity and mixed up with the gastric juice, which oozes into the stomach whenever food is put into it. This gastric juice is a clear, colorless, acid fluid, which flows freely into the stomach, as we have said, whenever food is taken into it. The free acid present in the gastric juice (of the dog) is lactic acid. The gastric juice has a very slight tendency to putrefaction and may be kept for an indefinite length of time in a common glass bottle without developing any putrescent odor. The peculiar property of this fluid is that it dissolves meat, boiled white of egg and such like substances. It does so even outside the body, but it does so best inside the body, assisted by the high temperature of the stomach and by its peculiar movements. Gastric juice does not dissolve all kinds of food. It does not dissolve fat, nor starch, nor oil. Its proper duty is to dissolve meat, gluten (the most nutritious part of bread), caseine (the most nutritious part of milk), albumen (white of egg), etc.—*Canada Globe.*

SOUND SLEEP.—*Hall's Journal* says: Any man who can bound out of bed as soon as he wakes of a mid-winter's morning is worth something; no fear of his not making his way through the world creditably, because he has the elements of a promptitude, decision and energy, which guarantee success. To invalids we make a comfortable suggestion worth knowing. If you have force of will enough to keep you from taking a second nap—and it is the "second nap" which makes its baneful influence felt on multitudes—it is better for you to lie awhile and think about it, until that feeling of weariness passes out of the limbs which you so commonly feel. But to sleep soundly, and to feel rested and refreshed when you wake up of a morning, four things are essential:—1. Go to bed with feet thoroughly dry and warm. 2. Take nothing for supper but some cold bread and butter and a single cup of weak warm tea of any kind. 3. Avoid over fatigue of body. 4. For the hour preceding bedtime, dismiss every egotistical subject from the mind, and let it be employed about something soothing and enlivening in cheerful thankfulness.

CARROT OINTMENT.—It is convenient, if not absolutely necessary, says a writer in the *Rural New Yorker*, to have on hand a sure remedy for burns, flesh-wounds, chapped hands, etc. The demand is supplied in many families by patent remedies, in ours by carrot ointment made as follows: To one medium-sized carrot, well washed and thinly sliced, allow one-fourth pound of freshly churned, unsalted butter. Place them together in a spider or other iron vessel, simmer slowly until the carrot is crisp and brown—taking care not to burn it, then strain through a thin cloth and keep in a tin box or wide-mouthed bottle. As a healer it has few equals. A few applications will cure the worst cases of chapped or cracked hands, provided the hands are well washed with castile soap and soft water, and well dried, just previous to its application. After applying the ointment rub the hands, warming and rubbing them until all is absorbed. It will speedily heal burns after the fire is extracted. Indeed, we use it in all cases where a healing agent is needed.

OVER-EATING.—As soon as you are sensible that you have eaten too much, take a walk, gradually increasing its rapidity until there is a free perspiration, and continue at this gait until every feeling of discomfort about the stomach and lungs has disappeared, then cool off very slowly in a closed room, and eat not an atom until the second meal thereafter, thus omitting one.

MINING SCIENTIFIC PRESS

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SAN FRANCISCO:

Saturday Morning, Feb. 9, 1878.

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The Week.

The week has been another rainy one and the streams are nearly all running pretty full. We notice, however, that in some parts of the State although a large amount of rain has fallen, the supply of water in the ditches is limited. Up on the Forest Hill Divide, for instance, the ditches are not more than one-fourth full. The Dutch Flat *Forum* says that at that place and Gold Run the ditches are by no means running to their full capacity. The deposits made by the late storms (from where the ditches take their supplies), although extensive, consisted principally of snow; the fall of rain being so limited that the ditches are not taxed to half their capacity in running water. An important event of the week is the flood in the neighborhood of Sacramento, noticed more fully elsewhere. A large extent of country in that vicinity is under water, and great damage has been done to the agriculturists. Another matter of importance to the mining community this week is the testimony elicited before the Assembly Committee on the debris question. We publish the testimony in this issue. It is worthy of note that the testimony of the Government engineers Gen. Alexander and Col. Mendell, and of Prof. Davidson of the Coast Survey, has some strong points for the miners, and the evidence of these disinterested experts is valuable. One curious feature is that some of them think there is as much debris brought down from newly plowed lands as from the hydraulic mines. The testimony is worthy of careful perusal. From the seat of war the startling news comes that the Russians are in possession of Constantinople, the stronghold of the Turk, and within the next few days matters of greatest importance to all Europe will be discussed or settled.

Experts in Arizona.

We notice in the Arizona papers a tendency among correspondents to grumble at the actions of the California experts, or would-be experts, in condemning properties which are offered for sale. One correspondent says these men infest the different districts for the reputed purpose of investing in the mines, but in reality "with the sole purpose, as it appears to the miners, of preventing capital from entering the Territory by means of their false and unfounded reports." The same correspondent says the miners ask, "what the devil do they mean?"

Perhaps the best answer to these questions is to state the fact that about ninety-nine out of every hundred of said "experts" are not experts at all, but simply adventurers, looking out for a chance to make some money without spending any. Nothing is easier in the world than for a man to come from San Francisco, represent himself as an expert sent by capitalists from San Francisco to purchase likely prospects, when said capitalists exist in the imagination only, and the expert's expertness consists in making unsuspecting miners believe his stories, and in his ability to make a living without work.

Every mining camp has had experience with men of this class, and still miners allow themselves to be deceived. They want to "bond" mines—which means if they can find some one else to buy another man's property from them they will kindly give the rightful owner about one-quarter of what they receive and retain the rest themselves. If they find no purchasers they are no worse off than before, while they stand a chance of making a good stake without investing a cent. Arizona is a fresh field, and is no doubt full of these people. It may be well to remind our many friends that genuine experts do not go to a country and herald themselves as such, or run around and pass free opinions on every prospect hole in the camp with an air of supreme authority and knowledge. They do not loaf about from one camp to another for six months or so; their time is too valuable for any such nonsense. Men who really know anything, do not flaunt their knowledge before the eyes of others, nor rattle off a string of unmeaning technical phrases for the delectation of a bar-room circle. Should we judge from the reports of the arrival of experts in the different camps in Arizona alone, we should suppose there were now a couple of hundred of these gentry down there from this city, and when we recollect also quite a number of mining frauds who have left here for that country that we know of, it seems highly probable that they are at their old business of expediting. One of these, at least, has been writing letters to the city filled with learned phrases gleaned from books, leading the unsuspecting to suppose that he is really, as he signs himself, a mining engineer, when he is in truth a charlatan, with simply knowledge enough to wear good clothes, talk learnedly of geology and mineralogy, and would be no more fit to pass on the merits of a mine than the greenest "tenderfoot" in the Black Hills. Such fellows deceive the honest miners too often, and if our Arizona friends will only look sharply after the would-be experts there will be fewer of them there next year.

But the miners must recollect, however, that they cannot expect a practical expert and mining engineer to pass favorably on a prospect hole with a ton or two of rich ore on the dump. That kind of business was long since played out. To sell a mine nowadays it must be really a mine. No 25-foot shaft with a few tons of ore will sell a mine for any price to capitalists. The ledges in Arizona though they may be rich on the surface, have not been proven to any great depth as yet, and until some of them are, capital will be slow to come there. Real experts employed by capitalists, report for the capitalists and not for the miner, and if they can see no better prospects than a 10 or 15-foot hole will show, they cannot reasonably be expected to recommend its purchase at large figures.

The Eclipse Mine.

EDITORS PRESS:—Having read in your paper of Saturday last, the letter of Superintendent Nelson, of the "Eclipse Mine," I fully corroborate with him as to accounts.

Having sent, myself, the monthly cost sheets to Mr. Bluett, London, from November, 1876 (when Captain Endey was in charge), until August, 1877, except one, for February, 1877, which Mr. Nelson forwarded, the time our Managing Director, Mr. Hulbert, was with us, I think the manner in which they have behaved and managed in London, can only themselves be blamed for the mine not being a success. Letter after letter, also cablegrams of vital importance have gone to the London office, which they never thought proper to answer, both from Prof. W. T. Rickard, F. C. S., and Mr. Nelson, also they have had generous offers to help them, of which they took no notice whatever.

This is not only unbusinesslike, but discourteous, and I think it most unpardonable of the Directors to allow the extensive property which they hold in trust for the "shareholders" to be frittered away in law.

JOSEPH H. BEAMAN, (late) Clerk.
105 Kearny Street, S. F., Feb. 4th, 1878.

Mining Debris.

Testimony Before an Assembly Committee

The Assembly Committee appointed to inquire into the injury done to the rivers and harbor by the debris carried down from the hydraulic mines in the mountains, have been in session in this city during the week. The Committee comprises D. A. Austin, of Yuba; M. Garver, of Nevada; Byron Waters, of San Bernardino; R. Kercheval, of Sacramento, and J. V. Coffey, of San Francisco. They have completed their labors in this city, and will take further testimony in Sacramento. We append a condensation of the testimony elicited from various parties during the examination this week.

Engineer Arrowsmith.

A. T. Arrowsmith, an engineer, testified that farmers on valley lands on Bear River had been obliged to construct levees to protect their land from debris, but their levees were carried away every year. He estimated that 50,000 acres are liable to be effected by debris. The only remedy he could suggest was for miners to buy up all the lands effected. The old channel of Bear River has been filled up since 1851. Gulches 15 to 20 feet deep, from 100 to 200 feet in width at top, are entirely obliterated. There is no channel of Bear river now—the water spreads. It was represented to me that the debris is from 15 to 20 feet deep in some places in Bear river valley. Went to Bear river to make observations in the interest of the farmers living at the mouth of the river. The land covered is entirely ruined. It is simply a barren sand bank. Did not obtain the information of the quantity of earth washed from the mines. Made my own measurements from information obtained from miners. The tender at the ditch told me he was obliged to sluice out 1,200 feet of the ditch, six feet deep by five feet in width, twice a week. The water was running over the dam constantly.

Captain Corlett.

Capt. William Corlett, who has been running on the Sacramento 29 years, stated that the Sacramento was greatly filled up. At the lower end of Steamboat slough there was 10 or 12 feet of water when I first went up the river, now we have only five feet. The river commenced shoaling badly in 1853. In 1855 we had to keep the channel clear. The filling has been going on more rapidly lately. In heavy winters it fills more. When we have a good summer for the hydraulic mines, a good deal of sediment comes down. San Pablo bay has been filled a good deal from Collinsville. A bar has been formed in Suisun bay. When I first went up you could not tell that a bar existed. Now, at low water, there is quite an island. In 1862 it would have been impossible to have kept the water off the land by levees. The overflow was from highland to highland and small steamers ran overland. The streams have lessened in carrying capacity by being filled in. Some shallow places have filled up entirely. At Sacramento the river has been lessened 18 feet in depth by debris. The average carrying capacity from Steamboat slough to Sacramento has lessened since I first knew it one-half; or in other words, one-half of the navigable space has gone.

Engineer Allardt.

G. F. Allardt, civil and hydraulic engineer, testified as to the existence, of a large body of sediment in the river waters, which is filling up the channels and bays. He said: On the Oakland shore and at Richardson's bay have filled up about half a foot in late years. The reclamation of the tide lands, if thorough, would confine the waters in their own channel, which would in times of flood cause the deposits, by increased force of the stream, to be carried further in the bay. I would not like to say what effect it might have on the bar. Mission bay will in time become dry land. The shoaling and filling in will only hasten that result. The removal of large quantities of material from the mountains and depositing the same in the bay of course is doing great injury to the bay. Cannot say what proportion of the material washed from the hydraulic mines reaches San Francisco. Some portion certainly reaches here, as the water is much discolored.

Colonel Mendell.

Col. Mendell, one of the U. S. Board of Engineers for the Pacific coast, who is in charge of the improvements on the Sacramento river and the construction of the Oakland harbor, said the only way in which the shoaling of the bay could be ascertained would be by proper surveys. Sand bars are usually got rid of by dredging or by increasing the current. If it then forms in another place it has to be treated in the same manner. The natural and artificial causes all tend to reduce the mountains to the level of the sea. Frosts, floods and ordinary actions of time are working to reduce the hills and fill up the harbors. The lands around the bays, which are near the level of high water, were formerly below the level of low water, and have been filled up, and the natural causes are to destroy the harbors. The first survey of the bay was made by an exploration party under Capt. Wilkes, which was sent here in 1841. It was so superficial that no comparison can be made of the depth of water on the bar at that period and now. Another survey was made by the Coast Survey in 1855, and another in 1873. A comparison which I have made between these two surveys, shows more water on the bar now

than in 1850. I would not give that as a fact that there is more water now than before, but there is not any less. Col. Mendell produced profiles of the bar and tide line made by himself from the coast surveys named, and presented the Committee with the same. Witness then continued: The effect of storms does cause bars to shift a little. From the survey of '55, the depth of water between San Francisco to Goat island ranges from seven fathoms at Market street to 24 fathoms close in by the island. The bar outside of the bay is the battle-ground between the sea on one side and the tidal current on the other, and the depth of the water on the bar is the result of the contest. If you diminish one force or increase the other, you will see the effect at once on the bar. Whatever matter is thrown into the bay, it has an increasing influence on the bar. Tide lands have been formed by deposits by the currents. About 158 square miles of the land around the bay has been so formed. This was made before hydraulic mining commenced on the coast. Before the State takes any movement to devise any means for the protection of the farmer and miner, the whole facts of the case should be ascertained. I would not give a snap for the opinions of all the people of California when compared to a few facts. With the facts before a board of engineers, a solution could soon be obtained. It is not a light matter any way you can look at it.

Fish Commissioner Redding.

B. B. Redding testified: I have had occasion to watch the effect of the mining debris along the banks of the rivers. Between 1850 and 1860 there was a large quantity of bottom lands on Bear river, but since the commencement of hydraulic mining it has been filled up until a railroad bridge crossing the river has had to be raised three times to keep it above high water mark. By forming a reservoir or bed on which the water can be turned to deposit its matter, the danger which will result as it now stands may be avoided. The matter comes down from the mountains and must go somewhere.

General Alexander.

Gen. Alexander, one of the U. S. Board of Engineers, said the debris from mining had done more or less injury to the farming land. Originally the Sacramento river carried less sediment than it does now. The sediment is deposited in the bed of the river, in Suisun bay, and in San Pablo bay, and then it comes down into this bay, particularly on the Oakland side. The plowing up of the lands and making it easy to be washed away also fills in the bed of the rivers. Which of the two causes is the greatest I cannot say.

Because a river carries a large amount of sediment it does not necessarily follow that there is a mine at the head of it. The Mississippi, with a less fall than the Sacramento, takes down sediment in a year sufficient to form a tract of land one mile square and 270 feet high. This matter has been found to consist of very fine powdered sand. The bar at the entrance of the bay is not formed, in my opinion, by deposits from the river, but solely from the sea during heavy southerly winds. If all the waters could be confined to the rivers the current would keep the bottoms clear. By building walls as on the Nile, 200 feet base and 50 feet high, or levees to keep the waters inclosed, the sediment will be disposed of. That may have the effect of filling up Suisun bay, but that will be filled up by natural causes ultimately. From natural causes the rivers keep muddy from the middle of November to the middle of March, or about one-third of the year.

The amount of space washed by mines is small compared to plowed lands, and the muddy water runs off through creeks into the river. I have been familiar with the waters of the Sacramento for 11 years. In that valley the hilly lands do not absorb the water which runs off. In level land the water does not run off at all, except in very heavy rains. There is no dead level land between the foothills and the river, but there is some about Colusa and Marysville. Some of the tule land is very level. From the base of the foothills, where the farming lands generally end, to the tules, the fall is about six or eight feet per mile, maximum. It is impossible almost to strike an average fall. The slope is greater at the foothills and grows less as it approaches the river. Regarding the west Side Irrigation Company: The San Joaquin and King's River canal has a fall of 12 inches to the mile, and that was so strong a grade that it washed the banks and the grade had to be leveled.

Mr. B. B. Redding.—I have been acquainted with the Sacramento river since 1850. It was not as muddy then as now. At Sacramento the river was as clear as crystal in 1850, and the American likewise. In summer California rivers are naturally clear, and if they are muddy it is from artificial causes. At Sacramento, the river has filled from 20 to 25 feet since 1850. A schooner sunk there then and cannot be found now. For the full length of the city, say three miles, it has filled up 25 feet. The river used to be approached by steep banks, and vessels took freight five miles up the American. The bars are all the time working down. Every year the floods lift up the sand and take it down stream by stages. In the flood of 1862 the water rose 24 feet above low-water mark. There are now three low-water marks, but the original one was based on 24 feet below the flood. I think the river has filled up 10 feet on an average since the flood.

Mr. Kercheval said that where steamers used to run without difficulty, small freight

boats now drag on the bottom. This rule is general.

Harbor Pilot Joliffe.

Capt. H. W. Joliffe testified: Have been a harbor pilot for 27 years. The pilots have an idea that the southern part of the bay is shoaling. Perhaps the ships are larger now than they used to be. One ship struck the bar at 23 feet, and another at 21. In the channel I don't know as any shoaling is going on. I think that ships are drawing more than formerly, and that may be a reason. Twenty years ago, we pilots never thought anything of the bar, but it is breaking now, more and more, every year. That indicates shoaling, for there are no breakers in deep water.

Captain Mayo.

Captain Charles Mayo testified: There is a substance which you draw up inside the Heads, but outside toward the Farallones, you do not find this substance. It looks like a disintegration and resembles iron from the hills. The pilots fancy the bar is getting wider—that is, no pass through breakers that were unknown twenty-five years ago. Whether this increased width comes from off shore not, I do not know. One fact is curious. On a dark night, if the captain wants to know where the ship lies in relation to the bar, we drop a lead. The substance brought up from the bottom inside the bar is not found outside. Therefore we can readily determine where the ship lies. This may throw some light on the subject. This is the only safe harbor on the coast, excepting, perhaps, Puget sound. San Diego harbor is not bad. The sea coming in from off shore southwest or south-southwest, is the cause of the breaking on the bar, while it is constantly being added to by the sand.

San Francisco Harbor.

Mr. Arrowsmith submitted an answer to a question propounded as to the injury done to the San Francisco harbor. He said the harbor has not been injured so far, because the debris has mostly settled in Suisun and San Pablo bays, especially in the former. As soon as these bays are filled, the debris will be deposited in the bay of San Francisco and at the bar.

The President of the North Bloomfield Mine.

Mr. Robinson next testified—He has been connected with the North Bloomfield M. Company as President, and also has large interests in farming. He said that the operations at the mine in Yuba county, which are large, shows that the average result is that one miner's inch of water removes one cubic yard of gravel. The material which reaches the farming land is very fine, and will not average three per cent. of the amount mined. The quantity deposited in the bays would not be likely to do injury. That deposited along the rivers is not altogether of bad effect, as it can be used in filling up low lands, etc. A large amount of the deposits left in the bay are the results of agricultural operations and the digging of canals, as well as through the simple operations of nature. If the mines must be closed to stop these deposits, farming should also be stopped. The investigation of the question should be left to unpartisan, scientific commission, totally free from local prejudices.

In answer to questions put by Assemblyman Kercheval, of Sacramento, the witness stated that seventy-five per cent. of the earth and gravel removed by the placer miners is deposited in the canyons in the vicinity. The reason that the San Joaquin was not filling as fast as the Sacramento river was because the country was comparatively new, and agricultural operations were not as extended. The Sacramento, above the Feather, was not filling as rapidly as below, because the current was stronger. From close calculation by himself, a small stream on his ranch, with a watershed of only 12 square miles has deposited over 2,500,000 cubic yards. The land drained by the stream was in the foothills. The Upper San Joaquin was comparatively clear in the dry season because the current was rapid.

In reply to the Chairman, Mr. Robinson stated that all the rivers from the foothills down were filling. This he thought was owing a good deal to natural causes. The same changes were going on all over the world, and were not wholly due to hydraulic mining—in some places not at all. The damage done to farming lands at the mouths of the upper rivers was largely due to hydraulic mining. The deposits left in the lower rivers and bays, however, were not due alone to the same causes. The witness thought the city of San Francisco had invested \$50,000,000 in hydraulic mines and ditches, which were worth from \$50,000,000 to \$100,000,000. He thought these mines paid more than six per cent. interest on capital invested. Agricultural lands he did not think paid more than three or four per cent.

A Hydraulic Engineer's Testimony.

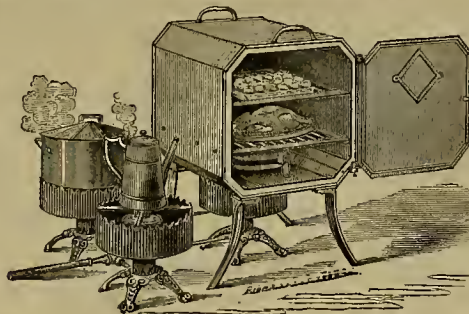
Hamilton Smith, Jr., civil engineer, testified as follows: Had for some time been engaged in hydraulic engineering. He thought that San Francisco alone had invested from \$35,000,000 to \$50,000,000 in hydraulic mines. He thought that if hydraulic mining was not interfered with, the yearly product will soon reach \$25,000,000 per year, and this rate will be kept up for many years. This year the production of the gravel mines will reach \$14,000,000. The increase of product will be due, not so much because of the larger extent of ground worked, but on account of the increased value of the ground. The bottom gravel, which will be worked in the future, is much heavier than what has been worked in the past, at least half of it being too heavy to be washed down lower than the canyons of the Yuba river. Large stones were washed down

into the Yuba canyons, and act as dams to stop the sediment and coarse sand from being washed down to the lower rivers and bays. The Yuba canyons would hold more than the amount of gravel which will ever be washed from the hydraulic mines. Very much more of the deposit washed down into the bays was on account of natural causes and agricultural operations, than from mining. The filling in of Suisun bay would not be deplorable, as the land so formed would be the most fertile in the State. The land along the shores of the lower part of San Francisco bay were formed from these deposits. There should be a complete system of levees, instead of having each land-owner operate separately. In some places on the San Joaquin, the width of the river has been so reduced that if the levees stand, the result will be that, in case of a flood, the water will be backed up and flood Stockton. The same would be the case on the Sacramento should the levees on Grand island stand. As far as his knowledge went the navigation of the Feather river has not been impeded of late years. The quantity of water which will be stored in large reservoirs soon to be finished, and which will be used in the dry seasons, will be so great that it will help navigation in the Feather river, especially in the summer months.

As to the shoaling of the bar, the filling up of the rivers would not effect this, unless the filling is done above the low-water line. He thought that the filling in of ground caused by the building of San Francisco, did more to decrease the tidal area than all the hydraulic mining. Did not think that the filling of Suisun bay would cause the deposits to be backed up in the country behind it. A great many years would elapse before Suisun bay would be filled up. The witness thought that a committee of competent engineers ought to be appointed to inquire into the question properly. He thought that at least \$500,000 should be appropriated for two years work.

Capital Invested in Placer Mining.

James P. Pierce, who is engaged in both farming and mining, was next sworn. Had been interested in mining 22 years. He thought that \$50,000,000 had been invested by San Francisco capitalists in placer mines, the value of which was from \$100,000,000 to \$150,000,000. He thought inside of five years the annual product of the placer mines will be in-



RETORT GAS STOVE COOKING APPARATUS.

creased to \$20,000,000 per annum. The expense of working these mines would not be so great in the future, in proportion to the product, as in the past. From one-half to three-quarters of the surface gravel of mines in which he was interested had been washed off. The value of the lower stratum in proportion to the upper is about four to one. Of the dirt at present being washed away at the Smartsville mine, Nevada county, one-half of it is too heavy to be washed on the lowlands and into the rivers and bays. This is the case at all the claims, the debris of which is deposited in the canyons of the Yuba river. Farming lands owned by the witness had been covered by deposits washed from the mines. The result was that land which was bought by him for \$5 per acre was paying interest on \$200 per acre. Five crops of alfalfa per year had been cut from this land. Land washed in Nevada county by this muddy water produced much more per acre than land in El Dorado county irrigated with clear water. Much land along the rivers, which produced nothing but mosquitoes, could be filled in by this deposit and made to produce 60 bushels of wheat an acre.

A large portion of the testimony was confirmatory of the testimony given by Hamilton Smith.

Mr. Kercheval, of the Committee, stated it had been his experience that this deposit was worthless. He also said that where, some years before, boats drawing eight feet had been run on the Feather river, now boats drawing only two and a half feet dragged the bottom.

Mr. Smith, engineer, stated that the lower gravel was worth 10 times as much as the surface gravel. This lower gravel is so much heavier than that on the surface that two and a half times as much water is required to move a given amount of dirt.

Condition of Sacramento River in 1850.

Egbert Judson, who is largely engaged in the manufacture of candles, powder, acids, etc., was next sworn: Most of these articles are used more in mining than in anything else. He had gone up the Sacramento in 1850 in a whale boat, and the river was so low in places that he was obliged to tow the boat part of the distance. Since then the river was never so low to his knowledge.

Professor Davidson.

Prof. Davidson, of the U. S. Coast Survey, testified: Regarding the formation of the bar, of which I have been acquainted for 27 years, we have a strong current going down the coast and one nearer the shore going north. This makes the southern points of all inlets, harbors, etc., sandy, while the northern points are of rocky formation and the bars are sandy. Our bar is formed by the sand pushed up along the shore line by the northerly current. The same can be seen at San Diego and Wilmington. In 1853, we made a survey of the approaches of San Francisco bay. The soundings were made to the nearest foot, running slightly under the nominal depth. For the last 20 years there had been no perceptible shoaling of the bar of San Francisco. If any had been going on, we certainly should have known it by the change in the soundings. There was a deposit of sea urelins there in 1853, and is there yet, showing no change has taken place, for any sediment over them would have destroyed them. As to the river deposits and their effect on shoaling: In early times very little sediment was brought down our rivers, because grass grew all over the country; but now the plowed lands discharge considerable soil, etc., which is consigned to the bay. As to the effect produced by the mines, I should say that their deposits form but a small proportion of debris compared to that produced by plowed lands. In fact, I think that the substance which causes the general shoaling is mainly brought down from plowed lands. It may take a long time to prove what effect it has on the bar, but not on the bay; however, the bar is susceptible of the greatest injury. I have seen the Sacramento river in all times, seasons and stages, but am unable to testify regarding its shoals, because I have not made any examination of the local causes thereof. My business has been more especially that of surveying the coast and bay. I have known large deposits to be made in the Dela-



RETORT HEATING STOVE.

ware river from plowed lands. Examinations of rivers have shown me deposits of wood, soil, leaves, etc., in the beds, in several instances 40 feet deep. There is no doubt that rivers are constantly undergoing shoaling from deposits. This is especially noteworthy in the Columbia river, where, 16 miles inside the mouth, harbors are now filled up and useless that a few years ago were constantly used by pilots. This great river receives tremendous deposits constantly. As to the Sacramento river, the channel must in due time fill up and become obliterated; and this is shown at Colusa, where the banks are 20 feet higher than the adjacent country. Rivers have a tendency to fill up and raise their channels, and, in fact, all our streams run on a crest or ridge. In floods, the water overflows and fills up the concomitant sloughs. This has the effect of throwing off a large quantity of debris out of the river proper into the valley on both sides, where it settles and becomes quiet. Regarding the reclamation of tide lands: If you throttle any harbor, you confine the tidal prism into a small area of water and deposition will proceed more rapidly. If no material is brought down, then there will be no decrease of water on the bar. Throttling a harbor is always hazardous.

Mr. Kercheval said it was going to be charged in the report that the reclamation of tide lands had the dangerous effect of filling up the bays. If so, he wanted an investigating committee appointed to discover and report that these regions had never been overflowed by tides to decrease the tidal area. The testimony of settlers on and near Sherman and Grand islands would prove that the tidal area is not being lessened by overflow.

Prof. Davidson—All those levees being built would have a tendency to throttle the mouths of rivers and to create back-water. The gentleman then said this question was very difficult and could not, he was satisfied, be settled unless several men would be appointed to give their whole time to it and investigate it. He knew the popular feeling against Commissioners, but thought that one should be appointed to investigate the matter. In response to an inquiry by Mr. Byrne, as to the probable cost of the work, he said he would make an estimate on the appropriation necessary for the payment of the two men to compose the Commission.

Mr. Kercheval said he was satisfied that a scientific investigation was needed, and asked Prof. Davidson when he could have his statement ready, and the latter replied within a few days. He recommended a physical survey of the State, saying that it would be a grand advertisement East and abroad and that it would be a beneficial undertaking.

The Retort Gas Stove.

We illustrate on this page a new gas stove for cooking or heating, office or house use, which has just been introduced on this coast by Mr. W. H. Seamans. The retort gas stove was invented by a distinguished physician and expert in the chemistry of gases and philosophical engineering, and is constructed on an entirely new and scientific principle.

The principle which enables this stove to produce an effective heat, with less gas than required by all others, without explosions, smell or smoke, consists in the novel mechanical arrangement of its parts and the superheating of the gas itself. Gas expands one four hundred and eightieth part of its volume for every degree of heat added—hence if taken into the stove at a temperature of 32° Fahr. and subjected to a heat of 960° Fahr., one cubic foot becomes three cubic feet by expansion and the density of the expanded gas is proportionately less. The admixture of air with the expanded gas is arranged with such accurate mechanical skill that combustion is perfect, whether one foot or twelve is burned, and the flame thrown evenly over the surface of the dish, so that all its parts are heated uniformly. The flame can be turned down so low as scarcely to be seen, still maintaining perfect combustion, and never flies back, causing explosions, under any circumstances. Currents of air cannot disarrange its cooking or heating qualities, the construction being so peculiar and ingenious that it cannot be clogged by anything spilled upon it, nor will it be changed by time or disuse, but will be found perfectly serviceable for years.

The principle on which the stove operates is simple. By passing the gas into the red hot retort, it is superheated before its union with the air. By superheating the gas is expanded three times in quantity, so that when it unites with the air the union is fully up to the maximum of perfect combustion, and at least 33% more heat is produced out of the same amount of gas than with other gas stoves.

Many persons object to gas stoves from an idea that they are more expensive than the ordinary stoves. This is not the case. The agent informs us that five feet of gas per hour affords a practical cooking heat. At a cost of \$3.75 per 1,000 feet, using two burners, and allowing one-half hour for cooking, the actual expense for fuel would then be less than two cents per breakfast. The gas is heated before being burnt. By heating the gas is expanded, and the air then unites with it. By being expanded or rarefied it is possible to unite three times the air with the same amount of gas as other stoves. In others the combustion amounts to a union of the common gas with the air; in this a union of the expanded gas with the air. By this process a perfect combustion is effected, so there is not a particle of smell of gas or smoke.

These stoves have been tested by some of the most eminent gas engineers in the country, and been recommended by them. The engineers of the gaslight companies in the principal cities of the United States recommend this stove—for instance, in Washington, Brooklyn, Albany; Pittsburg, Cleveland, Chicago, St. Louis, Memphis, Troy, Rochester, and others. There is no danger whatever from explosion in the use of these stoves, and they are light and compact, so they may be easily removed. Mr. Crockett, engineer of the S. F. Gaslight Co., has examined and tested the Retort gas stove and given it his approval and recommendation.

They are made both for cooking and heating purposes. Fig. 1 of the engravings represents a No. 3 cooking stove with oven. Each of the small stands is a stove in itself, and can be used separately or all together. Fig. 2 shows a heater for offices, halls, parlors, etc. The price of these stoves ranges from \$2.50 to \$14. The stove can be seen in operation at any time at Thomas Day's, 122 and 124 Sutter street.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Obollar, Jan. 30th, \$6,253.06; Northern Belle, 28th, \$2,309.90; Tybo, 25th, \$8,758.12; Alps, 31st, \$1,571; Bechtel, 31st, \$15,947.68; Northern Belle, 30th, \$3,195.40; Grand Prize, Feb. 2d, \$31,000; Leopard, 2d, \$4,400; California, 2d, \$189,578.31; Con. Virginia, 2d, \$188,526.29; Chollar, 2d, \$7,083.71; Day, Jan. 31st, \$1,182; Tybo Con. 31st and 29th, respectively, \$9,149.84, \$8,891.41; Northern Belle, Feb. 2d, \$3,050.12; Grand Prize, 6th, \$27,100; Manhattan, 2d, \$8,316.58; Martin White, 1st, \$16,087; Arizona, 2d, \$1,934.38; Endowment 4th, \$1,705.42; California, 5th, \$303,831.21; Con. Virginia, 5th, \$175,122.97; Alps, 5th, \$2,371.

The coinage at the Mint in this city this month was \$1,855,000, of which \$1,335 was trade dollars, and the balance \$521 pieces.

SMALL-POX excitement continues in Yamhill county, Oregon. Five deaths have occurred from the disease.

Matters at Mosquito Gulch.

A correspondent of the Calaveras Citizen, writing from Mosquito Gulch, in that county, says: The rain has come at last, and farmers and miners alike share the blessing. The gulches are full of water. The mills are running and the precious metal is being taken out of the earth for the benefit of us poor fellows who labor. We heard three whistles at noon to-day. The old San Bruno has all three engines at work, and a full crew of men will be employed in a few days. The Banner mine has just struck rich ore, and the Blue Jay has just struck the precious metal again. We expect good times here this summer.

If it were not for the mineral land being patented for farming purposes, this would be a good poor man's country yet. But we, as miners, are like the frontiersmen, we have to go back up in the mountains, so as the rancher can't follow us up. For as soon as he can get a surveyor, he will survey out his land, and then comes the old cry, "this is my land," and yet just as soon as the miner can get a claim that no one claims, here come all the ranchers that can raise a cabbage head or a pound of hay to the miner to get his money for his produce. But let the miner go inside the rancher's survey, and commence to sink a shaft, and see how soon he is driven out. If the miner wants to buy the quartz vein, the rancher will ask him two prices for it. The little town of Mosquito has the trouble of patented land.

This little town is situated in the best mining position of Mosquito Gulch. Mr. McNoble bought the ranch the town was located on. As soon as he bought the ranch he commenced to dispossess all the people of the property. He had a lively time of it. The people are going after the patent.

Information Concerning Patents

FOR THE

AUSTRALIAN COLONIES,

EAST INDIA, Etc.

The geographical position of San Francisco, and the fact of having a regular communication by means of a line of steamers renders our location here particularly favorable for taking out patents in these colonies for United States inventions. For the same reasons we include with these instructions those for the East India patents. American inventors, as a general thing, are not aware that Australia presents a better field for them to patent their inventions in than almost any other country, the United States and England excepted.

Comparatively little is known in the United States of this vast continent situated at the antipodes, and the almost fabulous richness and depth of the soil, the vast strides with which she has advanced in population and wealth are little known.

A correspondent who has lived 19 years in Australia, says: "I have been a little surprised about one thing in connection with your inventors, and that is that they don't make more use of the patent laws of these colonies. It is true that it is somewhat expensive to patent in all the colonies, still it would pay in some cases, and in others it would answer to patent an invention in two or three of the colonies. An efficient reaper and binder would pay to patent in all the colonies; so would an invention for preserving raw meat, or for benefiting those engaged in wool growing, while any really good invention for the benefit of those engaged in gold mining might be advantageously patented in three or four of them. Many American inventions have already been patented here, and have been very remunerative, and, as a rule, when properly pushed, almost any good invention might be made valuable if patented here. Ten times as many British inventions are patented here as American ones, yet it is notorious that the inventive faculty is not near so largely developed in them as in the Americans."

The continent of Australia has an area of 3,000,000 square miles, or nearly as much as that of the United States. A large portion of the interior is waste and unsettled, but wherever the colonies have made a start they have made rapid progress, in population and civilization.

There are seven Australian colonies, five of which are upon the continent, and the other two upon the adjacent islands. Of those on the continent four only are of considerable importance, namely, Victoria, New South Wales, Queensland and South Australia. The fifth—Western Australia—is separated from the rest by nearly 2,000 miles, and is used as a penal station by Great Britain. The island colonies are New Zealand and Tasmania, the first consisting of three islands of considerable size, while the last comprises one island. In importance these colonies stand at present in the order named (leaving out Western Australia), and have a united area of 2,136,180 square miles, with an aggregate population of upwards of 2,110,368 inhabitants. Each of these colonies has a well arranged patent law, and many of the inventions patented in the United States, could be advantageously patented and introduced here.

Victoria.

The first colony in population and importance, though not in size, is Victoria. This colony has an area of 88,198 square miles, and a population of about 800,000 inhabitants. The capital of Victoria is Melbourne, a city of upwards of 240,000 inhabitants.

A patent may be obtained in this colony for any new and useful manufacture. An invention already patented elsewhere may be patented at any time during the continuance of the prior patent, provided it has not been used or illustrated in the colony. An examination is usually made to determine the novelty and utility of the invention.

A patent may be obtained by the inventor whether resident or non-resident, but a mere importer cannot become a patentee. The documents required to obtain a patent are petition, specification and drawings in duplicate and of a given size, one copy being on parchment. The specification must be signed and sealed by the inventor. No model is required.

The term of a patent is fixed at 14 years but expires with any prior patent. The patent is not required to be worked in the colony. It is subject to a tax of £15 at the end of the third year, and one of £20 at the end of the seventh year. The expenses of a patent for three years, inclusive of government tax and all charges is \$200.

New South Wales.

This colony has an area of 323,437 square miles and a population of about 600,000. Its capital is Sydney, situated at the head of a magnificent harbor, and distant from Melbourne about 600 miles. The pastoral and mining interests predominate at present, and the colony is in a highly flourishing condition.

A patent or letters of registration, as the document is called, may be obtained in this colony for any invention or improvement. The term is 14 years and a preliminary examination is had to determine the novelty and utility of the invention. The patent may be obtained by the inventor, his agent or assignee, either colonist or alien.

The documents required are a petition, duplicate specifications and drawings. The law does not require the invention to be worked. The cost of a patent for the entire term, including government tax and all other expenses, is \$250.

Queensland.

This colony was set off a few years since from New South Wales, and has an area of 678,600 square miles and a population of upwards of 150,000. Its capital city is Brisbane.

A patent is granted in this colony to the inventor, his agent or assignee, for the term of 14 years, the same as in New South Wales. The documents required are also similar, a petition, duplicate specifications and drawings. The cost of a patent for the entire term, including all charges, is \$250.

South Australia.

This is the largest of the colonies, having an area of 914,730 square miles and a population of 198,257. Its capital is Adelaide.

Patents are granted in this colony for 14 years, an examination being made as to novelty. The documents required are a petition, duplicate specifications and drawings. The entire cost of a patent is \$250.

New Zealand.

This colony has an area of 105,000 square miles, and a population of 310,437. Its capital is Wellington, and its principal city is Auckland.

Letters patents in this colony are granted only when application is made there before anywhere else. Letters of registration, however, are issued to *bona fide* holders of letters patented elsewhere, and have the same force as, and expire with, the original patent. To obtain letters of registration, a certified copy of the specification, drawings and prior letters patent, and a declaration of the applicant that he is the *bona fide* holder of such letters patent, must be filed. If made by the assignee, a certified copy of the assignment and a declaration of the applicant must be filed. The entire cost of letters of registration in this colony is \$200.

Tasmania.

Patents are granted in this colony in essentially the same manner as in Victoria, and for the same time. The total cost is \$200.

Trade-Marks.

Trade-marks may be registered in the colonies of Victoria, New South Wales, Queensland, New Zealand and Tasmania. The cost of a Victorian trade-mark is \$60, and of the other colonies mentioned, \$50 each.

EAST INDIA.

An East Indian patent is granted for a term of 14 years, and must be for a new invention of public utility. The applicant must be the inventor, his executor, administrator, or assign, and may be a resident, non resident, British subject or alien.

The documents necessary are a petition, declaration, specification and drawings, together with five copies, one for each of the Presidencies. The cost of an East Indian patent is \$300.

Inventors will please write for any further information desired concerning the above colonies, the Canadas, and other foreign countries. Our American and foreign patent circular will be sent free on receipt of postage stamp. Samples of our first-class illustrated newspapers will be sent postpaid on receipt of 10 cents.

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Alpa.	124	102	111	111
Alta.	102	79	91	84
Andes.	95	70	60	75
Argenta.	61	1	1	1
Baltimore Con.	1	1	1	1
Belcher.	51	31	51	51
Bellmont.	75	70	60	70
Best & Belcher.	13	13	13	13
Bullion.	5	4	4	4
Bechtel.	10	10	10	10
Bodie.	21	12	11	11
Benton.	2,411	3,353	3,600	3,600
Caledonia.	223	273	261	261
California.	273	273	261	261
Challenge.	1	1	1	1
Chollar-Potosi.	35	291	321	31
Confidence.	90	75	85	70
Con Imperial.	241	181	221	221
Crown Point.	6	4	4	4
Dayton.	50	40	30	25
DeFrees.	2	1	1	1
Eureka Con.	371	381	351	351
Excelsior.	4,401	3,951	3,401	2,851
Endowment.	40	30	30	30
Enterprise.	40	30	30	30
Grand Prize.	14	12	12	12
Gila.	75	75	60	65
Golden Chariot.	85	75	110	110
Gould & Curry.	10	6	5	8
Hale & Nor.	10	10	10	10
Hussey.	30	20	40	35
Julia.	11	11	10	11
Justice.	11	9	9	11
Justine.	15	10	9	11
Joe Scates.	15	10	9	11
K. K. Con.	3	3	3	3
Kentuck.	41	4	4	4
Kosuth.	15	20	15	15
Lady Wash.	1	1	1	1
Leopard.	1	1	1	1
Leviathan.	40	25	20	20
Leeds.	2	2	2	2
Modoc.	60	50	25	40
Manhattan.	10	10	10	10
Meadow Valley.	20	30	30	25
Mexican.	14	11	13	14
North Con Virginia.	50	75	75	70
New York.	2	1	1	1
Northern Belle.	11	11	10	11
New Coso.	50	50	50	50
Navajo.	90	75	65	70
Occidental.	1,05	1	1	1
Ophir.	43	43	43	43
Overman.	21	17	17	17
Panther.	40	40	40	40
Raymond & Ely.	8	5	9	7
Rock Island.	15	10	10	10
Sage.	30	30	30	30
Seg Belcher.	12	32	30	30
Sierra Nevada.	4,85	3,90	4,03	4,70
Silver Hill.	3,4	2,80	2,80	2,80
Succor.	2	2	2	2
Solid Silver.	5	5	5	5
Star.	85	60	21	4
Trojan.	50	35	55	85
Union Con.	7	5	6	5
Utah.	10	10	10	10
Wells Fargo.	20	10	10	10
Woodville.	1	70	60	60
Yellow Jacket.	104	87	87	9

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Friday A. M. Feb. 1.	270 Belcher.	4,60
30 Alpha.	111	111
10 Alta.	102	102
225 Andes.	95	95
145 Belcher.	51	51
150 Bullion.	4	4
70 Best & Belcher.	13	13
240 Benton.	2,411	2,411
80 Boyle.	40	40
175 Chollar.	31	31
425 California.	273	273
400 Con Virginia.	221	221
130 Crown Point.	6	6
325 Con Imperial.	75	75
625 Caledonia.	2,80	2,80
185 Excelsior.	2,90	2,90
60 Gould & Curry.	10	10
160 Hale & Nor.	10	10
210 Justice.	10	10
70 Julia.	11	11
500 Joe Scates.	15	15
210 Kentuck.	41	41
500 Lady Wash.	1	1
190 Mexican.	13	13
2180 New York.	1,85	1,85
525 North Con Vir.	50	50
600 Ophir.	43	43
55 Overman.	17	17
200 Prospect.	25	25
465 Sage.	30	30
210 Sierra Nevada.	4,10	4,10
5 Seg Belcher.	12	12
225 Solid Silver.	5	5
255 Silver Hill.	2,80	2,80
100 St Louis.	25	25
250 Trojan.	50	50
285 Union Con.	7	7
130 Utah.	10	10
1275 Wells Fargo.	15	15
100 Woodville.	1	1
100 Ward.	1	1
670 Yellow Jacket.	9	9

650 Union Con.	60	60
200 Ward.	1	1
300 Wells Fargo.	20	20
150 Yellow Jacket.	104	104
100 Argenta.	1	1
75 Alpha.	102	102
165 Bullion.	4	4
115 Bodie.	21	21
30 Benton.	1	1
500 Con Virginia.	221	221
50 Chollar.	31	31
300 Caledonia.	2,80	2,80
35 Caledonia.	2,80	2,80
435 Day.	1	1
100 DeFrees.	2	2
240 Eureka Con.	371	371
280 El Dorado South.	8	8
200 Endowment.	40	40
255 Falcon.	30	30
845 Grand Prize.	13	13
100 Gould & Curry.	10	10
300 Hale & Nor.	10	10
40 Hamburg.	3	3
2095 Hussey.	30	30
100 Justice.	11	11
400 Leeds.	25	25
500 Leopard.	50	50
1940 Modoc.	30	30
105 Mexican.	13	13
100 Meadow Valley.	20	20
1105 Navajo.	1,80	1,80
10 Northern Belle.	10	10
650 New Coso.	90	90
110 California.	10	10
50 Overman.	17	17
50 Phenix.	1	1
50 Rye Patch.	1	1
650 Raymond & Ely.	8	8
215 Sage.	30	30
200 Star.	41	41
950 Tiptop.	3	3
500 Tuscarora.	5	5
150 Union Con.	6	6
100 Wells Fargo.	20	20
140 Yellow Jacket.	104	104

Tuesday A. M. Feb. 5.	100 Alpha.	102
1215 Alta.	102	102
625 Andes.	95	95
100 Argenta.	1	1
55 Belcher.	51	51
405 Best & Belcher.	13	13
200 Benton.	2,411	2,411
770 Con Imperial.	75	75
120 Caledonia.	2,80	2,80
35 Chollar.	31	31
220 Con Virginia.	221	221
625 California.	2,80	2,80
185 Excelsior.	2,90	2,90
30 Excelsior.	10	10
485 Gould & Curry.	10	10
340 Hale & Nor.	10	10
1650 Justice.	11	11
755 Julia.	11	11
35 Kentuck.	41	41
255 Leviathan.	20	20
130 Mexican.	13	13
200 Morning Star.	35	35
265 Overman.	17	17
1290 Ophir.	43	43
340 Sierra Nevada.	4,10	4,10
455 Silver Hill.	2,80	2,80
440 Sage.	30	30
220 Solid Silver.	5	5
100 St Louis.	25	25
850 Trojan.	50	50
195 Union Con.	7	7
135 Utah.	10	10
450 Wells Fargo.	15	15
250 Woodville.	1	1
460 Yellow Jacket.	104	104

Afternoon Session.	50 Alpha.	102
320 Argenta.	1	1
500 Argenta.	1	1
300 Argenta.	1	1
100 Belle Isle.	25	25
80 Bechtel.	10	10
100 Belmont.	75	75
200 Best & Belcher.	13	13
330 Benton.	2,411	2,411
400 Con Virginia.	221	221
225 Caledonia.	2,80	2,80
120 Caledonia.	2,80	2,80
400 Con Imperial.	75	75
110 Chollar.	31	31
210 DeFrees.	2	2
200 DeFrees.	2	2
1210 Day.	1	1
225 Eureka Con.	371	371
280 El Dorado.	8	8
200 Endowment.	40	40
670 Falcon.	30	30
110 Hale & Nor.	10	10
670 Falcon.	30	30
595 Grand Prize.	13	13
225 Gould & Curry.	10	10
35 Kentuck.	41	41
255 Leviathan.	20	20
130 Mexican.	13	13
200 Morning Star.	35	35
265 Overman.	17	17
1290 Ophir.	43	43
340 Sierra Nevada.	4,10	4,10
455 Silver Hill.	2,80	2,80
440 Sage.	30	30
220 Solid Silver.	5	5
100 St Louis.	25	25
850 Trojan.	50	50
195 Union Con.	7	7
135 Utah.	10	10
450 Wells Fargo.	15	15
250 Woodville.	1	1
460 Yellow Jacket.	104	104

SALES OF LAST WEEK AND THIS COMPARED.

Thursday A. M. Jan. 31.	30 Alpha.	102
565 Alta.	102	102
100 Andes.	95	95
300 Argenta.	1	1
100 Belle Isle.	25	25
80 Bechtel.	10	10
100 Belmont.	75	75
200 Best & Belcher.	13	13
330 Benton.	2,411	2,411
400 Con Virginia.	221	221
225 Caledonia.	2,80	2,80
120 Caledonia.	2,80	2,80
400 Con Imperial.	75	75
110 Chollar.	31	31
210 DeFrees.	2	2
200 DeFrees.	2	2
1210 Day.	1	1
225 Eureka Con.	371	371
280 El Dorado.	8	8
200 Endowment.	40	40
670 Falcon.	30	30
110 Hale & Nor.	10	10
670 Falcon.	30	30
595 Grand Prize.	13	13
225 Gould & Curry.	10	10
35 Kentuck.	41	41
255 Leviathan.	20	20
130 Mexican.	13	13
200 Morning Star.	35	35
265 Overman.	17	17
1290 Ophir.	43	43
340 Sierra Nevada.	4,10	4,10
455 Silver Hill.	2,80	2,80
440 Sage.	30	30
220 Solid Silver.	5	5
100 St Louis.	25	25
850 Trojan.	50	50
195 Union Con.	7	7
135 Utah.	10	10
450 Wells Fargo.	15	15
250 Woodville.	1	1
460 Yellow Jacket.	104	104

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Belmont M Co	Nevada	16	30	Feb 4	Mar 8	J W Pew	310 Pine St
Chollar-Potosi M Co	Washoe	6	100	Jan 22	Feb 25	J Gruss	418 California st
Crown Point M Co	Washoe	14	3	Jan 27	Feb 12	W E Dean	418 California st
Excelsior M Co	Washoe	33	100	Jan 27	Mar 5	J Newlands	418 California st
El Dorado South M Co	Washoe	12	100	Jan 27	Feb 20	J Gruss	418 California st
Modoc Curry M Co	Washoe	32	100	Dec 17	Jan 23	O A Sankey	331 Montgomery st
Julia Con M Co	Washoe	32	100	Dec 17	Jan 23	A K Darrow	331 Montgomery st
Justice M Co	Washoe	23	200	Jan 10	Feb 14	J S Kennedy	419 California st
Leviathan M Co	Nev	6	25	Jan 18	Feb 20	F S Luty	507 Montgomery st
Leopard M Co	California	5	50	Feb 4	Mar 11	R H Brown	327 Pine st
Modoc Curry M Co	Washoe	32	100	Dec 17	Jan 23	F R Dickman	327 Pine st
Mint G M Co	Washoe	20	15	Jan 3	Feb 1	O A Jennings	401 California st
Navajo M Co	Nev	3	40	Jan 2	Feb 11	R H Brown	Stock Exchange
Ophir M Co	Washoe	30	100	Jan 29	Feb 26	C L McCoy	419 California st
Rock Island M Co	Washoe	13	20	Jan 9	Feb 12	J W Clark	418 California st
Sierra Nevada S M Co	Washoe	32	100	Jan 27	Mar 5	A W Stetson	309 Montgomery st
Sage M Co	Washoe	32	100	Jan 27	Mar 5	E B Holmes	309 Montgomery st
Trojan M Co	Washoe	6	25	Dec 27	Jan 28	D Wilder	328 Montgomery st
Utah S M Co	Washoe	18	200	Jan 31	Mar 6	G C Pratt	309 Montgomery st
Yellow Jacket M Co	Washoe	28	200	Jan 2	Feb 2	F F Pope	Gold Hill
Woodville Con M Co	Washoe	6	25	Jan 23	Feb 23	J F Ennis	419 California st

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

Alpine Co	Washoe	2	10	Jan 26	Feb 28	A Provo Kluit	328 Montgomery st
Argenta M Co	Nev	2	15	Dec 11	Jan 21	R H Brown	327 Pine st
Alameda M Co	Cal	1	10	Dec 8	Jan 23	R B Bunker	606 Montgomery st
Alamo M Co	Cal	1	50	Dec 13	Jan 18	F H Hopkins	309 Montgomery st
Bodie M Co	Cal	1	50	Feb 4	Mar 18	W H Lent	309 Montgomery st
Del Rey M Co	Nev	2	3	Dec 15	Jan 31	S A Chapin	Merchant's Ex
Deer Creek M Co	Cal	9	600	Jan 4	Feb 8	E P Thurston	315 California st
Dursey M & W Co	Arizona	1	10	Jan 2	Feb 5	J Hardy	419 California st
Denver Quicksilver Con M Co	Cal	—	150	Jan 8	Mar 1	A C Sweetser	309 Montgomery st
El Tesoro M Co	Lower Cal	4	15	Jan 12	Feb 13	W H Chickering	214 Sansome st
Equitable Tunnel & M Co	Utah	16	10	Dec 19	Jan 24	C S Healey	Merchant's Ex
El Dorado Slate Co	Cal	3	30	Jan 2	Feb 3	F H Elias	524 Sacramento st
Eagle S M Co	Nev	7	50	Jan 18	Feb 23	R H Brown	327 Pine st
Enterprise Con M Co	Cal	16	10	Jan 21	Mar 2	R F Hermann	612 Commercial st
Falcon M Co	Tuscarora	2	15	Feb 6	Apr 2	R H Brown	327 Pine st
Ferry Eagle M Co	Cherry Creek	1	5	Jan 10	Feb 20	C T Bridge	224 California st
Gold Bar Gravel M Co	Cal	2	50	Jan 16	Feb 18	T F Hopkins	Stevensons Building
Gold Hill M Co	Cal	1	25	Jan 5	Feb 11	F Ogden	309 Montgomery st
Hemlock Con M Co	Nev	1	5	Oct 24	Jan 12	N P Sheldon	402 Montgomery st
Horshoe Gravel M Co	Cal	1	10	Jan 10	Apr 12	C S Healey	309 California st
Hornet M Co	Tuscarora	3	10	Jan 30	Mar 4	D F Verdenal	327 Pine st
Mariposa Land and M Co	Cal	13	100	Jan 7	Feb 11	L Leavitt	309 Montgomery st
New Coso M Co	Cal	7	50	Jan 4	Feb 11	D F Verdenal	327 Pine st
Nevada Gravel Co	Cal	1	5	Jan 17	Feb 18	Pentecost	511 California st
New Empire S M Co	Cal	2	10	Jan 23	Feb 26	D S Williams	419 California st
Northern Light M Co	Cal	2	25	Feb 5	Mar 8	F S Monroe	419 California st
North California M Co	Washoe	2	25	Feb 3	Mar 9	A P Kluit	328 Montgomery st
Pawnee M Co	Tuscarora	2	10	Feb 5	Mar 11	C Allenberg	438 California st
Piedmont Gravel M Co	Cal	1	10	Feb 10	Feb 20	A M Whitrow	309 Montgomery st
Summit M Co	Cal	1	5	Dec 10	Jan 21	J W Clark	418 California st
Sutro M Co	Washoe	3	2	Dec 22	Jan 30	A B Cathart	327 Pine st
Silver Prize M Co	Nev	1	10	Jan 3	Feb 3	C S Kinkley	1114 Leidesdorff st
South Overman Con M Co	Washoe	2	25	Dec 28	Jan 28	D Wilder	328 Montgomery st
Star Gravel M Co	Bodie District	1	10	Jan 1	Feb 19	C S Kinkley	331 Montgomery st
Young America M Co	Tuscarora	8	15	Jan 24	Feb 26	R H Brown	327 Pine st

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING JANUARY 22D.

TOBACCO DRYING MACHINE.—W. B. Isaacs, S. F.
WHIP-SOCKET.—A. H. Law, S. F.

ADJUSTABLE STIFF CRUTCHER FOR HARNESS.—
J. C. McCollum, Los Angeles, Cal.

HIGH AND LOW WATER INDICATOR FOR STEAM
BOILERS.—A. W. Vanderstou, Salem, Oregon.

TRADE-MARK.

LEMONADE-POWDERS.—J. A. Folger & Co., S. F.

TEAS.—J. A. Folger & Co., S. F.

TEAS.—J. A. Folger & Co., S. F.

TEAS.—J. A. Folger & Co., S. F.

LABELS.

SYLVESTER'S CURE FOR NEURALGIA AND DIPH-
THERIA.—Sylvester & Dunn, San Jose, Cal.

—The patents are not ready for delivery by the Patent
Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished
by DEWEY & CO., in the shortest time possible (by tel-
graph or otherwise) at the lowest rates. All patent in-
quiries for Pacific Coast inventors transacted with perfect
security and in the shortest possible time.

The Rainfall.

We seize the opportunity to compare the
figure of the rainfall this season and last, up
to the dates named, at the different points in
the State. There have been two other rains,
which are not caught in the figures above, except
in San Francisco. In arranging the table we have
taken a course from San Francisco northward,
around the head of the bay, then to the Sacra-
mento valley, thence up the San Joaquin, and
return along the coast and coast valleys to the
starting point. It will be seen that the contrast
shows favors from twice to thrice as great as
last season, and it must be remembered that a
good part of last year's rain fell in October and
was of little value. This year the great amount
comes in January and will be all made to con-
tribute to the prosperity of the State and the
comfort of our citizens:

San Francisco, Feb. 6.	18.77	Last year.	8.67
San Rafael, Jan. 31.	29.93		13.26
Petaluma, Feb. 1.	20.05		11.27
Headshurg, Feb. 1.	30.00		
Napa, Feb. 1.	13.16		10.38
Lakeport, Feb. 1.	10.20		10.20
Pomo, Jan. 31.	24.00		13.20
Vallejo, Feb. 1.	13.60		6.21
Vacaville, Jan. 30.	21.05		
Martinez, Jan. 31.	10.23		5.00
Chico, Jan. 31.	18.11		
Marysville, Jan. 31.	12.41		
Colusa, Feb. 1.	16.03		
Woodland, Jan. 31.	14.30		
Sacramento, Feb. 2.	11.90		6.61
Stockton, Jan. 31.	7.81		5.31
Modesto, Jan. 31.	6.30		
Fresno, Feb. 1.	7.50		
Merced, Jan. 31.	5.05		
Visalia, Jan. 31.	4.53		
Bakersfield, Jan. 31.	4.00		
San Diego, Jan. 30.	6.00		
Los Angeles, Feb. 2.	3.96		
San Bernardino, Jan. 30.	0.15		
San Barbara, Jan. 30.	12.83		3.04
San Luis Obispo, Feb. 1.	14.22		
Salinas City, Jan. 31.	10.51		3.64
Monterey, Jan. 30.	14.11		
Santa Cruz, Jan. 31.	18.40		6.22
Hollister, Jan. 31.	8.63		3.00
Gilroy, Feb. 1.	12.84		5.60
San Jose, Jan. 31.	8.65		3.77
Pleasanton, Jan. 31.	9.97		
Mission San Jose, Feb. 1.	9.44		
Oakland, Feb. 4.	16.14		

FLOOD AT SACRAMENTO.—As we write, on
Thursday, a large region of country adjacent
to Sacramento is under water and a great loss of
agricultural property will be occasioned. Re-
ports say that the levee on the east bank of the
Sacramento, a mile and a half below the city
broke at 3 o'clock Tuesday morning on Flint's
ranch. This has been for years a weak place,
but a new levee was constructed and a wing
dam put in last summer to keep off the current.
The water Tuesday morning broke in the new
soil. This break will flood all the land be-
tween the river and high land on the east for 20
miles down. One account says: It is impossible
to correctly estimate the damage already done,
but it may safely be said that it will reach at
the least half a million of dollars. The country
overlaid contains the vegetable gardens from
which the city derived its supply; also a large
portion of the slaughter-houses, cattle ranches,
feed yards in connection therewith, many sub-
stantial mansions and at least 1,000 small homes.
It was also a favorite location for hop yards
and nursery gardens, all of which have been
ruined. It is feared that a large number of cat-
tle have been drowned and large fields of well-
advanced crops inevitably damaged.

MINERS who wish to be posted on the mining
laws and decisions of the Commissioners should
purchase "Copp's Hand Book of Mining Laws."
It gives everything relating to the subject so
plainly that a miner need consult no lawyer for
advice on many propositions. There is a digest
of all the important rulings of the Land Office.
Price, \$1. For sale by Dewey & Co., 202 San-
some street, S. F.

Cost of Refining and Shipping Crude Bullion.

In conversation with a gentleman yesterday,
who is posted on all of the ins and outs of the
cost of refining and shipping crude bullion, we
were furnished with the following figures: The
freight on a ton of crude bullion from Eureka to
Pahsade is \$11.50; from thence to Ogden, \$17,
and from that point to the refinery at Newark,
N. J., \$31; the latter being in currency and the
two former in gold, making the total freight
rates \$59.50. The cost of separating and refining,
including a deduction of 12% for dross, is
\$23.50, which makes the total cost per ton \$82.
The discount on the silver is a still further in-
crease, and brings it to \$85, the price at which
lead is ruling in the New York market. The
product of base ores vary considerably, and it
will take from 3 1/2 to 5 tons of ore to produce
one ton of crude bullion. This bullion varies
in value according to the richness of the ores,
and will run from \$260 to over \$300 per ton,
and in some instances much higher, as in the
case of the output of the Matamoros furnace,
which, during its last run, turned out bullion
valued at \$400 per ton. This is exceptional,
however, and the great bulk produced will prob-
ably average \$280. It has been calculated that
the cost of raising and reducing a ton of ore is
\$35 per ton, which would make the cost of a
ton of bullion reach \$140. Granting that a ton
of the crude bullion contains gold and silver to
the amount of \$280 and that the refined lead
will pay separating and refining expenses, we
have a net profit of \$140 per ton.

In order to verify the above showing, we
were permitted to run over the books of
one of our largest companies, and found that it
was almost correct, their returns showing a net
profit of \$139.31 per ton on a six months' yield
of over 7,000 tons of bullion. It will be seen
by the above that the working expenses,
freights, discounts, etc., consume half of the
gross yield, and that ore assaying under \$35 per
ton will not pay to extract and smelt. There
are thousands of tons of low grade ore in the
district that await the advent of some cheap
concentrating process, which, if ever introduced,
will add materially to the resources and yield
of Eureka district.—Sentinel.

PROTECTION OF THE COLUMBIA SALMON.—
A bill, which has lately been introduced in
Congress by Senator Mitchell, prohibits the
taking of salmon in the Columbia river and
tributaries, by any means whatever, between
July 26th, and October 1st, of each year, and
impose penalties of at least \$1,000 fine for the
first offence, and \$1,500 fine and 12 months'
imprisonment for subsequent offences. Minute
regulations are prescribed concerning the tak-
ing by gill-nets, seines, weirs and traps be-
tween April 1st, and July 26th, and similar
heavy penalties are imposed for a violation.
The bill also prohibits throwing into the stream
saw-dust from the mills or waste liquids from
factories, tanneries, etc., between July 1st, and
December 31st, of each year, under penalty of
\$500 for each offence. One-half of the fines are
to be paid to informers and the rest devoted to
the propagation and preservation of fish under
direction of the Commissioner of fisheries.

DRIED PERSIMMONS.—Mr. Loomis showed us,
the other day, a box of dried persimmons just
received from Japan. They were of the Imperi-
cal or oblong variety, and when dried and
pressed made a fruit about three inches in
length, one and one-half inches in width, and
three-quarters of an inch thick. They were
packed with exceeding neatness in a box hold-
ing 50 of them. The box had a slatted bottom,
and there was a layer of coarse straw beneath
the fruit and between the layers. The cover
was raised above the fruit to admit the air.
These precautions are found necessary to pre-
vent the fruit from molding. The flavor is fine,
and taken with the handsome appearance, will
make dried persimmons a favorite article in the
market. They were dried without the addition
of sugar, and yet they were coated with a bright
coat of oil derived from their own juices.

Signal Service Meteorological Report.

Week Ending February 5, 1878.

HIGHEST AND LOWEST BAROMETER.						
Jan. 30	Jan. 31	Feb. 1	Feb. 2	Feb. 3	Feb. 4	Feb. 5
30.02	30.17	30.29	30.33	30.22	29.90	30.08
29.76	30.01	30.22	30.25	30.11	29.75	29.95
MINIMUM AND MAXIMUM THERMOMETER.						
61	60	57	60	50	59	55
53	53	47	50	51	52	47
MEAN DAILY HUMIDITY.						
70	74	78	77	81	71	59
PREVAILING WIND.						
W	W	N	N	S	NW	
WIND—MILES TRAVELED.						
335	283	135	87	106	179	363
STATE OF WEATHER.						
Fair.	Fair.	Clear.	Clear.	Cloudy.	Fair.	Fair.
RAINFALL IN TWENTY-FOUR HOURS.						
.73	.72				.95	
Total rain during the season, from July 1, 1877, 17.32 in.						

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & CO.]

SAN FRANCISCO, February 6, 3 P. M.

LEAD TENDERS in S. F., 11 A. M., 97 1/2 @ 98 1/2. SILVER, 4.90 @ 4.75. GOLD in New York, 102 1/2.

GOLD BARS, \$90 @ \$91. SILVER BARS, \$15 @ cent. dis-
count.
EXCHANGE on New York, 1%; on London bankers, 4%;
Commercial, 50; Paris, five francs 50 dollar; Mexican
dollars, 94.
LONDON Consols, 95 7/8; Bonds, 105 1/2.
QUICKSILVER in S. F., by the flask, \$1 lb, 46 @ 47 1/2.

METALS.

[WHOLESALE.]

WEDNESDAY, M., February 6, 1878.

IRON.—		
American Pig, ton.	28 00	@ 30 00
Scotch Pig, ton.	28 00	@ 30 00
White Pig, ton.	28 00	@ —
Oregon Pig, ton.	28 00	@ —
Refined Bar.	21 00	@ 31
Horse Shoes, keg.	5 00	@ 7 1/2
Nail Rod.	—	@ 7 1/2
Survey Oval.	—	@ 7 1/2
COPPER.—		
Sheathing, lb.	34 00	@ 35
Sheathing, Yellow.	21 00	@ —
Sheathing, Old Yellow.	12 00	@ —
Composition Nails.	24 00	@ —
Composition Bolts.	24 00	@ —

STEEL.—		
English Cast, lb.	13 00	@ 14
Anderson & Woods, ordinary sizes.	15 00	@ —
Drill.	15 00	@ —
Flat Bar.	14 00	@ 19
Plow Steel.	8 00	@ 12 1/2
TIN PLATES.—		
10x14 1/2 Charcoal.	7 50	@ 8 50
Banca Tin.	23 00	@ 24
Australian.	17 00	@ 17 1/2
ZINC.—		
By the Cask.	9 00	@ —
Zinc Sheet 7x3 ft, 7 to 10, lb.	9 00	@ 10
7x3 ft, 11 to 14.	10 00	@ —
8x4 ft, 8 to 10.	11 00	@ —
8x4 ft, 11 to 10.	11 00	@ —

NAILS.—		
Assorted sizes.	3 15	@ 3 25
QUICKSILVER.—		
By the lb.	43 00	@ 45

GENERAL MERCHANDISE.

[WHOLESALE.]

WEDNESDAY, M., February 6, 1878.

BAGS.—Jobbing.		
Eug Standard Wheat, 10 @ 10 1/2		
Neville & Co's		
Hand Sowed, 22x36, 10 @ 10 1/2		
24x30		
23x40		
Machine Swd, 22x36, 10 @ 10 1/2		
Flour Sacks, halves.	8 1/2	@ 10
Quarters.	5 1/2	@ 6 1/2
Eighties.	4 1/2	@ 5 1/2
Hessians, 60 inch.	15 00	@ —
45 inch.	8 1/2	@ —
40 inch.	8 1/2	@ —
Wool Sacks.		
Hand Sowed, 31 lb., 45 @ 250		
Machine Sowed.	42 1/2	@ —
4 lb do.	47 1/2	@ —
Standard Gunnies.	14 00	@ —
Bean Bags.	6 1/2	@ 8

CANDLES.—		
Crystal Wax.	17 1/2	@ 17 1/2
Eagle.	14 00	@ —
Patent Sperm.	25 00	@ 30
Assorted Pine.		
2 lb cans.	2 75	@ 3 00
Table do.	3 75	@ 4 25
Jams and Jellies.	4 25	@ —
Pickles, hf gal.	3 50	@ —
Sardines, qf br.	1 83	@ 1 90
Hf Boxes.	3 00	@ —

Preserved Beef.		
2 lb doz.	4 00	@ —
do 4 lb doz.	5 00	@ —
Preserved Mutton.		
2 lb doz.	4 00	@ —
Beef Tongue.	6 50	@ —
Preserved Ham.		
2 lb doz.	5 50	@ —
Deviled Ham 1 lb.		
do.	5 50	@ —
do Ham 1 lb doz.	3 00	@ —

COAL.—Jobbing.		
Australian, ton.	7 75	@ 8 00
Coos Bay.	6 50	@ 7 00
Bellingham Bay.	6 50	@ —
Seattle.	7 00	@ —
Cumberland.	14 00	@ —
Mt Diablo.	4 75	@ 6 75
Lehigh.	22 00	@ —
Liverpool.	7 50	@ 8 00
West Hartley.	7 50	@ 8 00
Scotch.	9 00	@ 10 00
Seranton.	13 00	@ 16 00
Vancouver Id.	7 50	@ —
Charcoal, sack.	75 00	@ —
Coke, bbl.	70 00	@ —

Sandwich Id.	21 1/2	@ —
Costa Rica.	19 1/2	@ 19 1/2
Guatemala.	19 1/2	@ 19 1/2
Java.	25 00	@ —
Manila.	19 1/2	@ 19 1/2
Ground, lb.	25 00	@ —
FISHL.		
Sac'to Dry Cod.	5 00	@ 6
do in cases.	7 1/2	@ —
Eastern Cod.	7 1/2	@ —
Saimon, bbls.	9 00	@ 10 00
Hf bbls.	4 75	@ 5 25
2 lb cans.	20 00	@ 20
Pkld Cod, bbls.	22 00	@ —
Hf bbls.	11 00	@ —
Mackerel, No. 1.	11 00	@ 12 00
Hf Bbls.	11 50	@ 12 00
In Kits.	3 00	@ —
Ex Mess.	3 75	@ —
Pkld Herring, lx 30 @ 3 50		
Boston Sprk, doz.	40 00	@ 50

LIME, ETC.		
Lime, Sta Cruz.	2 00	@ 2 25
Cement, Rosen- dale.	2 75	@ 3 50
Portland.	4 75	@ 5 50
LEATHER.		
SOLE LEATHER, heavy, lb.	26 00	@ 29
Light.	22 00	@ 24
Jodot, 8 Kil, doz.	48 00	@ 50 00
11 to 13 Kil.	65 00	@ 76 00
14 to 18 Kil.	65 00	@ 76 00
Second Choice, 11 to 13 Kil.	55 00	@ 70 00
Cornellian, 12 to 15 Kil.	67 00	@ 67 00
Females, 12 to 13 Kil.	63 00	@ 67 00
14 to 15 Kil.	67 00	@ 67 00
Simond, 12 to 13 Kil.	58 00	@ 60 00
14 to 15 Kil.	66 00	@ 70 00
16 to 17 Kil.	72 00	@ 74 00
Simon, 18 Kil.	61 00	@ 63 00
20 Kil.	60 00	@ 60 00
24 Kil.	72 00	@ 74 00
Robert, 7 and 9 Kil.	35 00	@ 40 00
Kips, French, lb.	1 00	@ 1 35
Cal. doz.	75 00	@ 80 00
French Sheep, all colors.	35 00	@ 38
Eastern Oat for Backs, lb.	1 00	@ 1 25
Sheep Roams for Topping, all colors, doz.	9 00	@ 13 00
For Linings.	5 50	@ 10 50
Cal. Russian Sheep Linings.	1 75	@ 30
Boat Legs, French Calf, pair.	4 00	@ —
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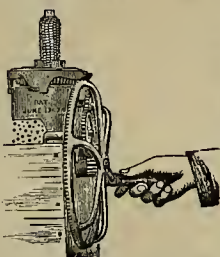
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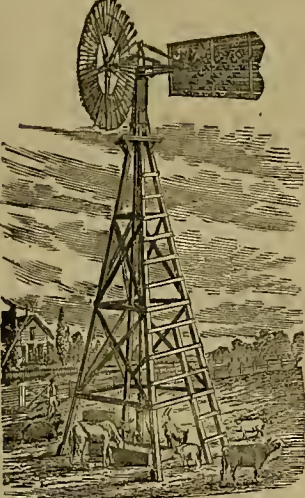
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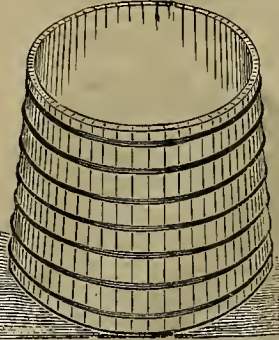
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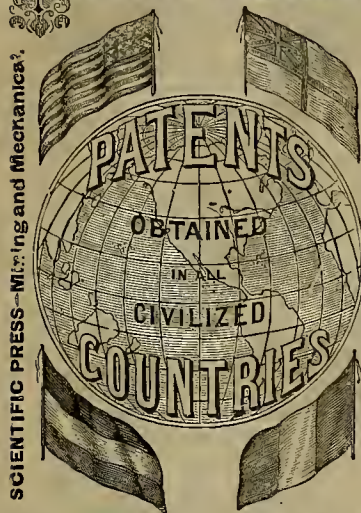
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Fancy Mining Companies.

The people of this coast have from time to time been "hitten" by buying interests in companies which proposed making money out of mining property in some very rapid way other than legitimate work. These gilt-edged companies are played out among us, however, and no matter how alluring a prospectus may be gotten up our people are too wary to be caught with chaff. Since the success of the bonanza mines the Eastern public have commenced to take an interest in mining matters here, and it is considered a good time for sharpers to put their schemes before them. Those who are unfamiliar with mining matters are apt to easily be fooled by fancy assays, fancy prospectuses and fanciful profits. It is the duty of all who have the real interests of the country at heart, to expose any such frauds as soon as possible, so that the unsuspecting may be put on their guard.

A case in point has just been brought to our notice. The Rocky Mountain Prospecting and Mining Co., issued a prospectus in the N. Y. Mining Record which would probably take with a great many people. It is as follows:

"Five hundred dollars, or one hundred dollars annually, for five years, will secure you through this company, one-half interest in either a gold, silver or copper mine, for which you would have to pay many thousands of dollars.

"W. H. Holmes, deputy U. S. surveyor and mineralogist and E. A. Egglestone, both veteran prospectors and successful locators of rich mines are exclusively devoted to prospecting of this company, in which they are largely interested. A valuable mine of precious ore is guaranteed in every instance.

"Twenty-two silver and gold mines are included in the property of this company. These are under process of development. The company's capital is \$250,000 in 2,500 shares of \$100 each, all of which are pledged as guarantee of security to those who order mines located.

"Parties ordering can take a one-half mine by paying the annual assessment of \$100; one-fourth by paying annually \$50; or a one-eighth by paying annually \$25. The company will pay for the work, recording, surveying and superintend all work, so that it is executed scientifically and economically. Parties may form clubs and order one or more mines. Exchanges made for desirable property. Satisfactory reference given as to competence and responsibility. Address, enclosing stamps, Rocky Mountain Prospecting and Mining Co."

Guaranteeing a valuable mine of precious ore is pretty good, and the idea of buying one-half or one-quarter or one-eighth of a mine for \$100 or \$50 or \$25 and leaving the company to pay for the work is better. Any mining man will see how nonsensical the whole thing is and what a pretty scheme was devised for raking the hoarded dollars of the Eastern folks who wanted to be bonanza kings. Unfortunately, however, for the projectors, the Surveyor General of Colorado comes to the front and says Holmes is not a deputy mineral surveyor, and the citizens of the town of Rosita, Colorado, come out in a card and denounce the whole scheme as a fraud. This card, which is published in an extra of the Rosita Index, is as follows:

"We, the undersigned, citizens of Custer, county, mine owners or otherwise interested in Custer county, Colorado, having its welfare at heart and not wishing to be considered as parties to any scheme or schemes fraudulent and not in accordance with the truths and facts in the case, declare hereby that all communications issued from Custer county, by one E. A. Egglestone, alias H. H. Horton, alias C. D. Crestone, alias Coronado, Rosa, Crusado, Trap-Rock, or under any other alias, are mostly fabrications of his own fertile and fraudulent brain, based upon air castles built by his imagination, intended to catch and deceive the unwary and innocent for the purpose of obtaining money by such overdrawn pictures and false representations. The above Rocky Mountain Prospecting and mining company, in our estimation, is a swindle, gotten up by said E. A. Egglestone and W. H. Holmes. To our knowledge, they have not 22 paying mines nor mines at all, and

both these men could not probably muster 250 cents between them. They have and do locate holes all over the district, and call them mines, and we, the undersigned, do hereby disavow and discountenance such proceedings as wrong and fraudulent and detrimental to the fair interests of Custer county. We ask respectfully for the publication of the above for the benefit of mankind."

We are very glad to be able to record an instance of this character, and must give the citizens of Rosita credit for having more backbone and sense than is usual. We are sorry to say that here, as elsewhere, hundreds of similar schemes, known to be fraudulent, have been floated, when they were known at home to be such. Yet the people of the camps in which they were inaugurated took no steps to prevent innocent persons from being victimized. The card given above is signed by over 60 citizens of Rosita, including the *bona fide* Mineral Surveyor—Mr. Wulsten, the postmaster, Justice of the Peace, County Treasurer, member of the Legislature, County Judge, President of the Town Board, cashier of the county bank, the County School Superintendent, the editor of the Index, the Town Clerk, a number of merchants, mine owners, and others.

This ought to explode the whole scheme, and probably has done so, and we have spoken thus



A TWO-HEADED SNAKE FOUND IN SANTA CLARA COUNTY.

at length on the subject so as to set an example to others in similar instances. If mining men in any camp, when they see any fraudulent scheme advertised, would immediately denounce the whole transaction, as the citizens of Rosita have done, such things would occur less frequently. This would tend greatly to purify the moral atmosphere surrounding our mining interests, and prevent innocent people from losing their money and sharpers from getting it.

CARIBOO.—A dispatch from Victoria relative to the Cariboo mines, says: Cooper, who located the Cooper claim on the Bonanza ledge, at an expense of \$48.50, has sold out to a company for \$6,000 cash. Labor is already scarce at Cariboo, as every man there either already own a claim or is engaged in the endeavor to discover one. Several companies are already doing good work. The St. Laurentz and American are driving a tunnel on their claim. A company known as the Lord and Lady Dufferin are reported to have struck a ledge crossing Grouse creek, and ledges have been traced as far as Antler.

THE CON. VIRGINIA AND CALIFORNIA mining companies have made applications for patents under the provisions of the Act of May 10th, 1872, and due notice thereof is given by publication according to law. The first named company claims 711.27 linear feet of the Comstock lode, with surface ground of the width of 1,442.66 feet, and the latter 350.60 linear feet, with surface ground 1445.64 feet in width.

Woodville Con. vs. Woodville.

The Woodville Consolidated Silver Mining Company has brought suit in the Fourth District Court against the Woodville Gold and Silver Mining Company—G. D. Roberts, G. W. Kidd, S. F. Gasbiller, C. F. McDermott, Charles Kaufman and John W. Pearson—to recover possession of 57,400 shares of the stock of the defendant company, and also of 2,600 shares of the stock from the defendant Pearson; also for an injunction to restrain the defendants from issuing, transferring or in any manner disposing of any shares of the capital stock of the defendant company, and likewise from levying an assessment on the stock or selling any of it by virtue of delinquency. The suit is based on an alleged agreement entered into in January, 1875, by which the plaintiff undertook and agreed to issue and deliver 60,000 shares of the capital stock of the plaintiff to the defendant company in the following manner: For every share of the capital stock of the defendant presented and surrendered to the plaintiff one share of the capital stock of the plaintiff, and so on until 60,000 shares should be issued and delivered, and the plaintiff further undertook and

agreed to accept and discharge fully all the obligations and liabilities of the defendant company, which on its part agreed to forthwith execute and deliver to the plaintiff a conveyance of certain mining ground and property situated in Storey county, Nevada. In compliance with the agreement the plaintiff delivered to the defendant 57,400 shares of its capital stock, and the defendant executed the conveyance referred to. The remaining 2,600 shares were not presented to the plaintiff because the holders were not known, but the plaintiff transferred on its part its corresponding number of shares to Pearson in trust. Plaintiff next avers that Pearson, who was President of the defendant company, caused the entry of the adoption of the resolution authorizing the execution of the conveyance in question to be torn from the record book of the company, so that the conveyance became of doubtful authenticity—in fact, gave no legal title to the property. Plaintiff, therefore, alleges that its shares were obtained fraudulently, and brings suit to obtain redress.

LEAD.—The Selby smelting works, of San Francisco, produced, in 1877, 5,912 tons of pig lead. Of this, 499 tons were exported to China, 2,797 to New York, and consumed there 2,616 tons at their shot tower works. The price of pig lead in San Francisco is 5@5½; sheet lead, 9c; bar lead, 6½. The Richmond Consolidated mine produced, in 1877, 5,200 tons of pig lead. During 1878 it is expected that the lead product of the Eureka mine will be shipped to that city.

A Very Wonderful Freak of Nature.

A Perfect and Lively Two-Headed Snake.

[Written for the Press by J. W. A. WRIGHT.]

All students of natural history and anatomy, and everyone whose attention is arrested by the wonderful works of nature, can but take interest in the subject of this sketch, and the very truthful likenesses herewith, the photograph and engraving for which, of life size, were prepared in the office of the Press, with no little trouble, from the living and rather too active freak, which we propose to describe in brief. A real two-headed snake, healthy, living, and handsome as any snake can well be, and no mistake, no Barnum-like trick about it! This *lusus nature*, so successfully represented by your artists, was found November 27th, upon the line of the narrow gauge railroad now being constructed between San Jose and Santa Cruz, at Los Gatos, Santa Clara county, near the foot hills of Santa Cruz mountains. It was discovered under a stick of fir wood by a Mr. Connelly and Mr. J. W. Linden, and is now the property of the latter gentleman, with whom Mr. Woodward, of our noted pleasure gardens, was negotiating for its purchase. Should it live and thrive, it will be one of the greatest curiosities ever introduced into his extensive and instructive collection. Mr. W. E. Livermore had charge of his snake-ship in this city a week after his capture, and through his courtesy the likenesses and facts here presented were obtained.

A careful examination indicates that it is a young specimen of the familiar species known as the bull-snake, pine-snake, or, more commonly in this State, the gopher-snake (*Pituophis Wilkesi*), our Pacific coast species. It supplies here the place of the chicken-snakes, so common as house-snakes east of the Mississippi river (*Ophibolus eximius* north of the 37th parallel and *Scotophis quadrivittatus* south of that line), and feeds upon gopher rats, other small animals and birds. It is a harmless snake, we having no poisonous one in California but the rattlesnake. This two-headed one is 22 inches long, of uncertain age, but perhaps only a few months old, since full-grown ones attain a length of from six to seven feet. Its ground color is a dingy, yellowish-white, with a dorsal row of chestnut-brown spots, nearly square and 75 in number, from the point where the two necks separate, extending its full length. On each side are two lateral rows of smaller spots of similar form and color. It has on each head the two sets of occipital plates, which help to distinguish its species, one set of three, of nearly equal size, in a row between the eyes. There are two additional dorsal spots on each neck, above the point of division. From the point, where the crotch formed by the two necks begins, to the tip of each snout is about an inch and a half. The two heads and necks are entirely separated for nearly an inch. Both heads and necks appear perfect and entirely symmetrical in every way. Each head has two good eyes, equally large and full. It can shoot out each forked tongue together or one by one. The two perfect mouths open into one throat. Each neck is equally flexible and the movement of each head is perfectly easy and natural. The two heads can be placed closely side by side, or one above the other and even crossed or spread widely apart at will, as is shown in the figure engraved.

Each seems to have equal power, and to be alike subject to separate control and motion. It eats and drinks equally well with either mouth. One can but think it would have a serious time, when it gets larger, if each head should ever attempt to swallow the same gopher at once.

Can any one tell us of other instances of such a double-headed reptile, as California has now certainly produced in this snake? The myths of old about hydras, etc., are excluded from the competition.

SPECIMENS.—We have received a specimen of silver-bearing rock from the Excelsior mine, Copper City, Shasta county, contributed by Mrs. B. F. Frank, of Reading. The ledge is 14 feet wide in places. We have also received an undetermined specimen from a mine in the same vicinity.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EHS.

The Mokelumne Ditch and Irrigation Co.'s Dam.

EDITORS PRESS:—Thinking that the progress of an enterprise which has for its object the irrigation of 300,000 acres of the best land in the rich county of San Joaquin may be interesting to many, I last Saturday rode up to the point in the Mokelumne river where the company's dam is in process of construction. My self-imposed task was a very pleasant one. The recent timely rains had given the air the agreeable softness of spring, and the upspringing grain with delicate shade of green was making the most of present opportunities. The way led from the pleasant town of Lockeford through a beautiful, undulating country in view of some of the choicest bottom land of the Mokelumne, leading toward the end of my ride, through some rough foothill land of Calaveras county, and in the midst of worked out and abandoned mining claims. In this part of the route the aforementioned spring air was blended with a foreign air, lent by the Mongolian visage of cheap labor employed on its own account with cradle and rocker in extracting the root of all evil from neighboring gulches. The results are to them pecuniary, and to outside "barbarians" didactic. The yield is six bits per day for each man, and the lesson taught is viz: Never cease to endeavor and to labor even in seasons when the compensation is small.

Thirteen miles east from Lockeford I reached the dam, which is 29 miles distant from Stockton. The site is near Lancha Plana (flat boat), a place which in its best days, following the discovery of gold on Winter's bar in 1852, polled 350 votes. After taking out many hundred thousand dollars, the miners sought fresh fields and pastures new, and the town-to-day numbers less than 100. The dam is located in the Mokelumne between Westmoreland's bridge and Winter's bar, at a point where the river narrows between bluffs rising 40 feet above its bed.

G. C. Holman, a civil engineer, residing near Lockeford, made his first survey and handed in his report March 17th, 1877. The dam is built after specifications drawn by Mr. Holman, though they have since been modified in some particulars. Mr. Holman is chief engineer and has charge of the construction of the headworks and canals. Work upon the dam commenced October 18th, 1877, under the supervision of Engineer Cravens, of San Francisco, and is now being conducted under the direction of Mr. Wallace, of Stockton. Sixty-five men were at first employed, and 47 are at present engaged in its construction.

A coffer dam was built and an excavation made in the bed of the river 56 feet in width, 7 feet depth on one side and 18 feet on the other, the whole filled with broken rock laid in cement, forming a solid foundation. The dam is 270 feet in length, abutting on either side on a solid rock formation, giving it additional strength and security. Its height will be 25 feet and its width on top eight feet. The slope on the inside is 14 inches horizontal to one foot rise, and on the outside nine inches horizontal to one foot rise. The dam is built of stone and is to be capped with timber sills and faced with plank. The sills will be secured with iron rods to girders laid under a course of stone. The dam is built with a course of stone laid in cement in the center to prevent percolation of water, and the inside will silt up with the wash of the river.

The rock used in building is quarried out of solid rock near each end of the dam, and is a heavy blue granite mixed with quartz and weighs 175 pounds per cubic foot. It is blasted out in blocks weighing from 500 pounds to 4½ tons, and is laid in course without dressing, filling in with small stones or broken rock. The weight of the dam when completed is estimated at 7,000 tons, or 14,000,000 pounds.

Under the articles of incorporation, the company claim 100,000 inches of water, miners' measurement, which is equivalent to a flow of 1,965 cubic feet per second. At times of high freshets the river is said to run 1,000,000 inches of water, or 19,650 cubic feet per second. When we reflect upon the immense pressure this volume of water, flowing in a channel less than 300 feet in width, must bring to bear on all obstacles, and know also that 300,000 feet of logs lie in the bed of the river above, which, in the event of a sudden freshet would ride swift upon the flood threatening all before it, over-rending, crushing and grinding in their mad career all that may oppose, we may form some idea of the strength required in a work of this kind to successfully withstand the force that may be launched against it. The work was planned by competent engineers and is undoubtedly strong enough to meet its requirements. The dam is but two-thirds completed and should be finished as rapidly as possible to escape the disastrous effects of an early rise.

H. EUGENE H.

Woodbridge, Jan. 23d.

The New Mining Bill.

The Method Proposed to Stop Swindling in Mining Stock Transactions.

The following bill was introduced in the California Assembly last week by Mr. Tuttle, who said he did so by request. It is understood that this bill is an administrative measure, and is drawn in conformity with the views and promises made by Governor Irwin in his last message:

An Act to encourage the mining industry and to suppress stock gambling.
The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. It shall be the duty of the Governor, within 30 days after the passage of this Act, to appoint a Mining Commissioner for the term of four years, who shall, within 10 days after his appointment, qualify and execute an official bond in the sum of \$50,000, to be approved by the Governor and Attorney-General, and filed in the office of the Secretary of State. No person shall be eligible to the office of Mining Commissioner who is an officer, agent, employee or stockholder in any mining corporation, or who is in any way connected with any hoard or association of stock brokers; and if at any time after his appointment he shall become such, it shall be the duty of the Governor, upon ascertaining the fact, to remove him and appoint a successor.

The Commissioner's Office.

SEC. 2. The Mining Commissioner shall keep his office in the city and county of San Francisco, and it shall be open during every business day throughout the year, from 9 A. M. until 5 P. M. The records of the office shall be accessible to the public during business hours, and the Commissioner must provide a convenient and conspicuous place for exhibiting to the public the information obtained by him from the mining companies as hereinafter provided.

Blank Forms to be Furnished.

SEC. 3. As soon as possible after his appointment, the Commissioner must prepare and furnish to all the mining corporations organized under the laws of this State, or doing business in this State, blank forms with instructions to fill them out in accordance with the provisions of this Act, and return them to his office at the times hereinafter specified; and he may make such changes from time to time in the form of such blanks as may seem to him best adapted to elicit the information required to be furnished by this Act.

Notice in Writing.

SEC. 4. For the purpose of enabling the Commissioner to comply with the preceding section, the Secretary of State shall, upon the application of the Commissioner, furnish to him a complete list of all mining corporations organized under the laws of the State, stating also the place named in the articles of incorporation as the principal place of business of each corporation. And it shall be the duty of each corporation engaged in mining in this State, or organized under the laws of this State for the purpose of mining elsewhere, to give the Commissioner notice in writing of the address of the President and Secretary thereof.

Bond to be Filed.

SEC. 5. The Commissioner must require every corporation not incorporated under the laws of this State, but engaged in or proposing to engage in the business of mining in this State, before commencing such business, or if already so engaged, then immediately to file in his office a bond to be signed by an officer of the corporation, with two good and sufficient sureties, to be approved by the Commissioner, in the penal sum of \$10,000, hindering the corporation to conform to all the provisions of this Act.

Copies of Articles of Incorporation.

SEC. 6. The Commissioner must require every corporation engaged in mining in this State, and every mining corporation formed under the laws of this State, to file in his office as follows:

1. If incorporated under the laws of this State, a copy of the articles of incorporation and statement of any increase or diminution of the capital stock, certified by the Secretary of State to be a copy of that which is filed in his office; or, if incorporated under the laws of any other State or country, a copy of the articles of incorporation, charter, deed of settlement, or other document under which the organization was formed, duly certified by the officer having the custody of such articles of incorporation or other document. Such copy of articles of incorporation or other document, must be furnished at once upon demand of the Commissioner.

Weekly Reports.

2. A weekly report by each corporation, to be made every Saturday; provided, that if any corporation should desire to make its report on a different day of the week, it may do so with the consent of the Commissioner. The report shall be duly verified by the oath of some officer of the corporation, giving a full and accurate account of all explorations in the mine under the control of the corporation during the week preceding; stating the length of tunnels, drifts or crosscuts run; winzes, shafts or other excavations sunk; borings with the diamond drill, and all other explorations in and about the mine, together with a statement of the highest and lowest assays, total number of assays made, and the fair average thereof; and also a state-

ment of the location and a description of all ore bodies encountered in the prospecting operations of the week. The report shall also state the number of tons of ore extracted during the week, the number of tons reduced, the value of the bullion shipped and remaining on hand, and such other information as may be from time to time required to be given by the Commissioner as of importance to the stockholders or to the general public. And if, during the interval of making said weekly reports, any important discovery should be made, materially affecting the value or the prospects of the mine, or if there should be a serious caving or flooding of the mine, the same shall be reported at once to the Commissioner.

Monthly Reports.

3. A monthly report by each corporation, duly verified by the oath of an officer thereof, showing the actual financial condition of the company at the close of each fiscal month, the receipts and from what sources, the disbursements and for what purpose, the number of tons of ore extracted, the number of tons of ore reduced, the value of the bullion product for the month, the amount of the assessments levied or collected, the balance of cash on hand, the amount of the indebtedness, if any. Also, an inventory of the property belonging to the corporation and its cash value.

Estimate of Expenses.

4. An estimate, duly verified by the oath of an officer of the corporation, of the expenses for each quarter, to be prepared and filed in the office of the Commissioner at the beginning of the quarter, stating the probable amount of money required to conduct the operations of the company during the next quarter, and for what purposes, and whether it will be necessary to levy an assessment, and the amount thereof. If the corporation shall at any time determine to change its plans so as to require an additional amount of money, exceeding the sum of \$10,000, the fact and the amount that will probably be required shall be at once reported to the Commissioner.

Annual Reports.

5. A copy of the annual reports of the corporation, duly verified by the oath of an officer thereof, to be accompanied by a complete map of all explorations in the mine, and tables of statistics showing the product, receipts and disbursements in detail during the year.

Verified Copies.

6. A copy of all the annual reports of the corporation since the date of organization; or if such copies or any of them cannot be furnished by reason of the loss of records, the fact of the loss and the cause thereof must be stated by a report duly verified by the oath of an officer of the corporation.

Other Papers.

7. Any other report or paper relative to the business or property of the corporation which the Commissioner may deem essential to the accomplishment of the purposes of this Act.

Penalties for Refusing to Make Reports.

SEC. 7. Any corporation which shall neglect or refuse to make the reports and estimates herein required, or any of them, or shall refuse to admit any person authorized by the Commissioner to inspect the mine or books of the corporation, shall forfeit a sum not less than \$1,000 nor more than \$100,000 for each and every such offense, and it shall be the duty of the Commissioner to institute proceedings forthwith in any Court of competent jurisdiction for the collection of the same. In case judgment shall be recovered in such proceedings, if neither the corporation nor the stockholders are able to satisfy the judgment rendered, the Commissioner shall immediately institute proceedings to disincorporate the company.

Penalty for False Reports.

SEC. 8. Any corporation which shall make a false report upon any matter herein specified to be reported upon, shall be subject to the penalty prescribed in the preceding section. In addition, the corporation and the officers thereof shall be jointly and severally liable for any loss that may be sustained by any person by reason of such false report, to be recovered in a civil action, as in other cases.

Stockholders May Call for Investigations.

SEC. 9. If at any time the Commissioner has cause to believe that a report of operations in or about a mine is not substantially true, or that the financial report of a corporation is not correct, he shall appoint a competent expert to visit the mine, or to inspect the books and papers of the corporation, requiring him to make a thorough investigation, and submit a report, duly verified by oath, stating the facts found by him. Upon the written application of any stockholder, who will deposit the money necessary to defray the expenses, he shall appoint an expert to make such investigation and submit such a report. Should the report of the expert show that the report of the corporation was false in any essential respect, the corporation shall forthwith be proceeded against by the Commissioner, as provided in section 7 of this Act. The money deposited to defray the expenses of the investigation shall, if a judgment be obtained against the corporation, be returned to the party or parties making such deposit.

Information from Individuals.

SEC. 10. In addition to the reports required from mining corporations it shall be the duty of the Commissioner to obtain all the information he can from individuals and firms engaged in the business of mining in this State. For that

purpose he shall distribute proper blank forms to them, and request them to furnish annually a statement showing the location of their mines; whether quartz or gravel mines; the total yield; manner and cost of working the gravel mines; the width of quartz veins; depth and extent of explorations; yield in tons of ore, and value of bullion; cost of mining in detail; cost of reducing ores, and all other expenses; amount of profits and loss; future prospects of the mines; means and cost of transporting supplies, and such other information concerning the mining industry as may be of general interest.

Annual Report to the Governor.

SEC. 11. The Mining Commissioner shall annually submit to the Governor a concise and careful report for the year ending June 30th upon the condition and prospects of the mining industry of the State, accompanied by a full table of statistics from all the mines, so far as he is able to obtain them, including the mines outside of this State owned by corporations organized under the laws of this State.

Unlawful to Raise or Depress the Prices of Stocks.

SEC. 12. It shall be unlawful for any person to attempt to raise or depress the price of stocks by making or causing to be made wash, fictitious or fraudulent sales or purchases of stock. All transactions in stocks in which the seller is also the buyer, either in person or through others, are fraudulent and fictitious within the meaning of this Act.

About Officers.

SEC. 13. It shall be unlawful for any officer of a mining corporation to be pecuniarily interested, directly or indirectly, in any contract for the milling of ores, the furnishing of supplies, or the doing of any other business of the corporation.

No Stock to be Resold.

SEC. 14. It shall be unlawful for the Trustees or Directors of a mining corporation to resell any stock of the corporation that has been bought by the corporation on account of delinquent assessments. All stock purchased on such account shall be canceled and deducted from the capital stock of the corporation. And it shall be unlawful to mark any certificate of stock in any way whatever to indicate that an assessment duly levied has been paid, until the amount of such assessment has been actually paid in lawful money of the United States, and credited on the books of the corporation.

Penalties.

SEC. 15. Any violation of sections 12, 13 and 14 of this Act shall be punishable by imprisonment in the county jail for a term not less than six months, or in the State prison for a term not more than 10 years, or by a fine not less than \$500 nor more than \$10,000, or by both such fine and imprisonment; and the same penalty shall apply to any officer of a mining corporation who shall use his official position in any way to secure gains to himself or to any other person to the injury of any stockholder.

Name of Real Owner on Certificates.

SEC. 16. All certificates of the stock of mining corporations shall specify the name of the real owner thereof. If issued in the name of a Trustee, the certificate must also give the name of the beneficiary. All certificates of such stock issued in disregard of this section shall be void.

Record of Sales and Values.

SEC. 17. Every Board, Stock Exchange or association of brokers engaged in the business of buying and selling the shares of incorporated mining companies, shall cause to be kept a full and complete record of all purchases and sales of such shares made by the members of such Board, Exchange or association, showing the name of the buyer, the name of the seller, the number of shares bought and sold in each transaction, together with the name of the stock and the price per share agreed to be paid; and shall also cause a copy of the said record to be printed daily at the expense of the Board, Exchange or association of brokers, one of which printed copies, duly verified, shall be furnished to the Mining Commissioner, to be delivered on the day of publication, and one to the State Controller, to be mailed on the day of the date thereof. Each Board, Exchange or association of brokers shall also cause a written statement to be made at the end of each calendar month, or within five days thereafter, showing the total value of all the purchases and all the sales of each member of the Board, Exchange or association of brokers during the month, to be verified by the oath of an officer of the Board, Exchange or association, and filed in the office of the Mining Commissioner, a copy of the same to be transmitted by mail to the State Controller.

Statement of Sales.

SEC. 18. Every broker or firm of brokers engaged in the business of buying and selling the shares of incorporated mining companies shall, at the end of each calendar month, or within five days thereafter, submit to the Mining Commissioner a statement, duly verified under oath, upon a form to be furnished by the Commissioner, showing the full amount of his or their purchases and sales of said stocks, whether such transactions occurred at the sessions of a Stock Board, Exchange or association, or otherwise, stating separately the transactions in the Stock Board or Exchange and those made elsewhere. Upon filing said statement with the Commissioner, said broker or brokers shall pay over to the Commissioner one-half of one per centum of

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MECHANICAL PROGRESS.

Hints for Testing Lathes.

Prof. Sweet remarks in the *Polytechnic Review* that it never does to assume the lathe centers are true, or that the lathe if set so as to turn absolutely parallel. To test the accuracy of the adjustment for turning parallel, first see that the live center is perfectly true. Put a properly centered bar of iron or steel in the lathe and turn a short distance at the foot stock end, opposite the dead center; reverse the bar in the lathe and set the point of a tool just so as to "tick" the turned place; then, without disturbing the tool, remove the piece and run the slide down until the tool comes to the next dead center; put the piece in the lathe as it originally was when turned, and if the lathe is set true, the point of the tool will "tick" the same as at the live center; if not, the foot-stock can be adjusted so it will "tick."

The following device suggests itself: A plain disc of metal, say 10 inches in diameter, and one-tenth of an inch thick, with a center hole one-sixteenth of an inch in diameter and straight through, when placed on the centers of a lathe, if the centers do not coincide, the error will be magnified 100-fold; and moving the centers so as to bring the disc in the plane of the face-plate, ought to produce an accurate adjustment.

In testing the accuracy of the main spindle of a lathe, set the two centers so as to coincide and grasp a piece of large gas pipe or a stick of wood, three or four feet long, in the lathe-chuck—when in motion strike with a lead pencil on the end of the wood, or a plug in the end of the gas pipe, a small circle; and when the dead center is brought up to this circle, it should, if the lathe is true, coincide with the center of the circle, or be slightly above it, as the gas pipe or wood would be slightly deflected by its own weight.

A NEW TYPE SETTING MACHINE.—Inventors are still in pursuit of machine type-setting and distributing. *Engineering* says that a new form of type-composing and distributing machine has just been placed on exhibition in London. The apparatus is the invention of Mr. Heinemann, and it consists mainly of a type frame or case, and a movable type-extractor carrying the composing stick. The case is fixed at an angle, and is divided into a number of vertical spaces for holding the various types. Below the case is a steel slide-bar upon which the extractor works, and is free to be moved either to the right or left by the compositor. The type extractor has two handles, one fixed on the left side, and by which it is moved to and fro, and the other movable on the right, by which process of extracting the types is performed. The operator adjusts the extractor to the letter required, in doing which he is guided by a graduated scale combined with the representation of the letters in each rack, the spaces on the scale corresponding to the letters. He then depresses the movable handle, which causes a small projecting piece at the back to engage in the space between the teeth of a steel comb, and which fixes the position of the extractor. At the same time a small piston advances forward, press a type before it out of the rack into the composing stick which is held in the receiver. On reversing the handle the type just pushed down the distance of its own thickness in the stick to make room for the next, the extractor is released, and is passed on to the next type required. When the composing stick is full, a spring is actuated by which a warning bell is rung. The full stick is then removed and an empty one substituted, the type being afterwards justified. There is also an arrangement for distributing the type.

THE ELECTRIC LIGHT IN A WORK SHOP.—On the 18th ult., says the *Railway World*, an experiment was made with the electric light in the Michigan Southern and Lake Shore railway shops in Cleveland. The shop in which the experiment was tried was 80x150 feet, filled with machinery, lumber, etc., and the ceiling and walls begrimed as is usual in such places. The whole was brilliantly illuminated by two electric lamps, one hung near each end. Each light was 2000-candle power, or equal to 125 gas burners of the usual size. The electricity was furnished by a three-horse Brush dynamo-electric machine. The cost was estimated as follows: Cost of three-horse power, estimated at one-half cent per horse power per hour, one and one-half cents; consumption of carbon in two lamps, three and one-half inches, seven cents; 10% per annum on cost of engine and machine, three and one-half cents; total cost per hour of light equal to 250 gas burners, 12 cents; 10 six-foot gas burners, gas at \$2 per thousand, cost 12 cents; relative expense 1 to 25. In addition to these advantages, the light is pure white, like sunlight, there is no danger in its use corresponding to defective or leaky gas pipes, and the amount of carbonic acid and other deleterious gases given off is asserted to be, compared to gas, as 1 to 200.

FIRE-PROOF BUILDING.—A few days since, says the *American Manufacturer*, while visiting the works of Wm. B. Seafie & Sons, of Pittsburgh, we were shown something of interest. They were desirous of making one of their floors between the first and second stories as nearly fire-proof as possible. The joists were of wood, and without sufficient protection could

readily burn. On the under side of the joists or ceiling was securely nailed well painted corrugated iron. The spaces between the joists were filled with a concrete of cinder and sand, and enriched with enough lime to set very solid. Over this was placed a thin layer of sand and a brick floor. Of course, if it had been desirable, a tile, marble, wood or any other kind of floor could have been used instead. With this improved floor a fire might burn for many hours in one story without communicating with the other, for the joists could at best only char or burn slowly from the edge. The improvement is especially applicable to all classes of stores and warehouses. The corrugated iron ceiling presents a fine appearance, and cannot be shaken off or cracked, like plastering, nor does it shrink, like ceilings covered with wood and strips. Any degree of ornamentation can be carried out that is desired. It does not prevent the use of cornices or moldings round the room next to the ceiling, and where center-pieces around gas lights or chandeliers are wanted they can easily be attached.

UTILISING WATER POWER TO COMPRESS AIR.—With a view to utilize water power by converting it into more manageable pneumatic power, Messrs. Swan and Hughes, of Farnby, England, have constructed an annular trough in which a weighted chamber, like a gasometer, floats in water or other liquid; within the annulus is a second covered chamber into which the water from the head is let; this water forces the air up through a valve into the floating chamber, raising the said chamber; when it has been raised to its full height the valve between the floating chamber and the central one is then automatically closed, and the air from the floating chamber is utilized for work. The water falling in the central chamber draws air by means of a pipe and valves from another chamber, in which is another similar weighted movable chamber, which by the partial vacuum formed is drawn up, and by its descent after gives out power by compressing air. Thus, while one chamber is filling, the other is giving out power. The annular trough should be kept full of liquid, but in some cases can be entirely dispensed with, the central chamber being immersed in the water, and a pipe with a valve on top being placed below it above the water line, syphons can take the place of the valves.

MANUFACTURE OF FERRO-MANGANESE IN FRANCE.—The Saint Louis iron works, near Marseilles, recently sent to the Paris Civil Engineers' Society, a specimen of its ferro-manganese, or, to speak more correctly, manganese pig. In 1862 the works began to make manganese pig, delivering to steelmakers in the Loire and Isere a white pig, called "facette" pig, which contained 3% to 6% manganese. In 1864 were adopted processes borrowed from those used in Siegen; and spiegeleisen, containing 9% to 10% of manganese, was made at a time when the manufacture of spiegeleisen, was elsewhere all but localized on the banks of the Rhine. The Saint Louis manganese pig now contains up to 85% manganese. The sample shown to the society was granular, or a gray, approaching the color of steel rather than that of gray or white pig. The reduction of manganese oxides is found not to be easy; the same furnace which would produce 50 to 60 tons per diem of steely gray pig, can only be made to produce 20 to 24 tons of alloys rich in manganese.

GLASS TYPE.—The *Toronto Globe* says that of the Bastie toughened glass not much has been heard lately, since its unreliability for lamp chimneys was proved by actual experience. A new and somewhat surprising use for it has been found in France in the manufacture of printing types. The glass is, of course, much cheaper than type metal, is harder, will take on a finer face, is more durable as respects fair wear and is stated to be less liable to damage than metal from the occurrence of such little accidents as the dropping upon it of mallets and "shooting-sticks." Not least among the many advantages claimed for glass type is that it can be cast in the matrices already used for making metal, so that no expense will attend the substitution of the new material. It is stated that thorough experiments have been made and the adaptability of the glass to the purpose proved.

THE EXPORT OF TOYS.—In former years, a large portion of the toys used in this country came from Europe. Now the trade is the other way, and the Old World is buying largely from America, not only the peculiarly American inventions, but also the toys which formerly were made abroad. The export trade in toys, which amounted last year to over \$1,000,000, began five or six years ago. Then E. G. Williams, the agent of a large exporting firm, says a number of bankers sent some American-made toys to Cuba and South America. The trade then extended to London and thence to Hamburg and Paris. Now nearly every foreign steamer carries large quantities.

PNEUMATIC CLOCKS.—A company has been formed in Paris for working the system of pneumatic clocks—time-measures by air-pressure—adopted successfully in Vienna. The compressed air is fed into a reservoir, which gives off a uniform pressure of half an atmosphere, the compressed air received by each clock being released by a pellet and pendulum in the usual way. A large number of clocks can be grouped in connection with a single reservoir, and the time can be laid on to houses by piping, just as gas and water.

SCIENTIFIC PROGRESS.

Poisoned Arrows.

EDITORS PRESS:—The account given by your correspondent, in a recent number of the *Press*, of arrows poisoned by the American Indians, recalls the following statement made in "Hardy's Travels in Mexico" (London edition of 1829, p. 298), of the Seris Indians, who inhabit the island of Tiburon, in the Gulf of California, a short distance north of Guaymas:

"They first kill a cow, and take from it its liver. They then collect rattlesnakes, scorpions, centipedes and tarantulas, which they confine in a hole with the liver. The next process is to beat them with sticks in order to enrage them, and being thus infuriated they fasten their fangs and exhaust their venom upon each other and upon the liver. When the whole mass is in a state of corruption, the women take the arrows and pass their points through it; they are then allowed to dry in the shade."

This addition to the information already furnished by your correspondent, enlarges the area within which this horrible device was practiced, at least 1,000 miles in a southwestern direction, and adds a further interest to the curious fact. Another fact, equally interesting, is that Cortes, Diaz, and the other historians of the conquest of Mexico by the Spaniards, make no mention of poisoned arrows, which they could not have omitted to notice, if they had met them; yet the Aztecs could not have been ignorant of them, for their knowledge of everything within thousands of miles on each side of their capital was not only precise but very minute. Had they, then, rejected poisoned arrows as instruments of warfare, from the same sentiment which prohibits explosive bullets at this day?

J. W. D.

San Francisco, Feb. 9th.

Philosophy of Spontaneous Combustion.

Mr. Chas. W. Vincent, in the *Journal of the Society of Arts*, has a long paper on spontaneous combustion in factories, ships, etc. From it we make the following extracts concerning the philosophy of spontaneous combustion, which deserves the most careful consideration from all manufacturers:

Strictly speaking, there is no such phenomenon as spontaneous combustion. The inflammation of various organic and inorganic substances without the immediate contact of any ignited matter, which has given rise to the term, is nevertheless, as certainly the result of some direct act or acts which can be accurately traced, as is the firing of a lucifer match when struck on a rough surface.

It need not be a matter of surprise that bodies containing so much bound-up heat as do the vegetable fibers of all kinds, more particularly hay, cotton, etc., coal of all kinds, oily rags, greasy sawdust, varnish rags used by painters and polishers, the waste at railway lamp stores, etc., should be particularly liable to take fire when stored in bulk.

Spontaneous combustion of these substances can only take place when they are so packed that small increments of heat may be stored up. If they are freely exposed to the air, the heat evolving action which goes on with it may be increased rapidly; but, as when the hand is waved in mobile air, the infinitesimal blows are free to rebound and react over so large a space that their effect is dissipated. But when their striking space is limited they act like the struck air inclosed in the fire syringe, their heat motion is intensified by concentration, and ultimately throws the whole mass into such commotion that the moving power of the molecules is manifested as light as well as heat.

But there must be a beginning to this heat motion. Oiled rags and bodies of that kind derive the initial movement from the oxidation of the oil. Perfectly dry vegetable fiber at ordinary temperatures oxidizes extremely slowly; it is practically indestructible by atmospheric oxidation. Mummy cloths possess much strength after the lapse of two or three thousand years. Oils, however, are formed at the expense of a still larger amount of heat than vegetable fiber; the elements comprising them are combined much more loosely, and they are, consequently, ready to form more stable compounds, and release their bound-up heat on very slender provocation. Oils absorb oxygen with great avidity, becoming viscid, and in case of drying oils, solid. In doing this they give out heat, which is due partly to the condensation of the oxygen, and partly to the carbon and hydrogen of the oil having, by combination with the gas, lost part of their energy; in fact, they have been partially burnt.

Microscopical Society.

The annual meeting of the San Francisco Microscopical Society was held on Thursday evening, February 7th, with a good attendance of members and Vice-President H. C. Hyde in the chair. The annual report of the President was necessarily deferred till the next meeting, in consequence of Prof. Ashburner being in Oregon, but the report of the Treasurer, Mr. T. A. Langstroth, was read, and showed that the Society was in a very flourishing condition.

Proceeding to the election of officers for the ensuing year, the result was as follows: President, Henry C. Hyde; Vice-President, C.

Mason Kinne; Recording Secretary, N. Y. Clark; Corresponding Secretary, C. W. Banks; Treasurer, J. A. Langstroth. The best of feeling prevailed and there seemed to be a unanimity of purpose to make the seventh year of the organization one of the most profitable from a scientific standpoint and several papers on important subjects were promised for coming meetings.

The promotion of Col. Kinne to the Vice-Presidency is worthy of special mention. He has served the Society as Secretary for a number of years in a most intelligent and faithful manner. His reports, published in the leading scientific journals at the East, have done much to secure recognition for the good work which the Society has done—a recognition which has resulted in awarding the San Francisco Society the leading place among similar organizations in this country. Col. Kinne's reports, printed in our local papers, and his gentlemanly personal presentation of the claims of the Society, have also done much in building up the local membership and in inciting members to careful, systematic work with the microscope. We are glad to note his advancement.

The Liquefaction of the Gases.

A week or two ago we gave an account of the liquefaction of oxygen, and hinted that nitrogen and hydrogen had also been conquered. The account of this latter achievement comes to us in a foreign exchange containing the following, which was presented to the French Academy of Sciences: "M. Berthelot begs to say that he witnessed the experiments conducted by M. Cailletet yesterday and to-day on nitrogen and hydrogen. The liquefaction of nitrogen seems to leave no room for uncertainty after the succession of the phenomena which have been described. The observations made on hydrogen yielded signs of liquefaction which, to his eyes, were not doubtful. They were, however, less complete and more difficult to appreciate than in the case of nitrogen. From their appearance and the brevity of their duration, they may be compared with the attenuated liquid dust produced towards the end of the phenomena, recognized with nitrogen at the moment when the cloud is vanishing. The extreme tenuity of the liquefied particles constituting this hydrogen mist—a sort of diffused luminosity—as well as their more rapid return to the gaseous condition, accorded entirely with the comparative properties of hydrogen and the other gases. That which characterizes M. Cailletet's experiments, and gives them the certitude which belongs to them, is the fact that in one and the same transparent and limited space, they permit the comparison of the gas in the three successive conditions of a compressed elastic fluid, a pulverized liquid, and a fluid in great part expanded. We must also take into account, in estimating the value of M. Cailletet's experiments, the facility with which each can at once be repeated as often as may be desired, so that each phase of the phenomenon can be reproduced for separate study. More in such a matter cannot be demonstrated; at least not until some scientific man, profiting by the recent discoveries, succeeds in isolating in the static condition of stable liquids, capable of being kept permanently under observation, the gases which have been liquefied for the first time by M. Cailletet in a dynamic state, if I may be allowed the expression—that is, in the state of liquids which, momentarily formed under the observer's eye, at once evaporate and escape observation."

MUSEUMS AS USEFUL INSTITUTIONS.—Prof. Marsh in the *Popular Science Monthly* says: The old idea of a museum was a showroom; the modern idea makes it a work-shop as well. If this institution is to hold high rank in science, as we hope, it will not be in consequence of the spacious halls before us, crowded though they be with the rarest of Nature's prospects; but, rather, it will come through the small work-rooms in the attic, where the naturalist, with microscope or scalpel, has patiently worked out discoveries that add to the sum of human knowledge. This museum will fail of its highest good, fail even to achieve more than a local influence, unless the work-rooms above are made the most important feature of the whole. These vast collections will spread the elements of natural science among the people of New York, and the surrounding region; but the quiet workers in the attic, who pursue science for its own sake, will bring the museum renown throughout the world.

PRESENCE OF BENZENE IN COAL GAS.—The presence of benzene in coal gas has been verified, says a French paper, by the action of fuming nitric acid upon the gas and the subsequent reactions of the nitro-benzene formed. It is also found that nitric acid does not act upon ethylene in an appreciable manner, so that this method of estimating the quantity of benzene is not vitiated by the presence of ethylene. Experiments show that only traces of benzene and ethylene are soluble in monohydrate of sulphuric acid (H-S-O₄·H₂O, sp. gr. 1.781 at 14°), whilst on the other hand propylene and acetylene are completely absorbed, the former in a few minutes, the latter in 25 minutes. The illuminating power of gas is due mainly to the presence of benzene, and it would seem that the illuminating power of a flame is not due to the numerical relation of the carbon to the hydrogen, but, as Franklin has shown, to the condensation of these elements in the unit of volume.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

MINE SOLD.—Alpine Chronicle, Feb. 2: B. E. Hunter, of Monitor, returned from San Francisco on Wednesday's stage. We are glad to be able to note that Mr. Hunter concluded a sale of the Tarshish mine, mill, etc., to a San Francisco company, and that work will be started as soon as the new owners can make the necessary arrangements. The Tarshish is a valuable property and we hope its development will be prosecuted with energy by its new owners.

AMADOR.

LINCOLN.—Amador Ledger, Feb. 9: The second clean-up of this mine since the resumption of work, was made last week. We have not learned the exact amount of the run, but are able to state on the best authority, that the yield was satisfactory. The ore is being taken from the 200-ft and 400-ft levels. Drifts are being pushed into the northern portion of the mine—comparatively unexplored country. Between 60 and 70 hands are employed around the mine and mill, the full capacity of the latter, 40 stamps, is kept running constantly.

CENTENNIAL.—This mine is located on Dry creek, two miles from Plymouth. Appearances indicate that it will make its mark in the future history of Amador county. The ledge is seven feet thick. A small seam of slaty matter, two or three inches thick, runs through the ledge. This is found to be rich in gold and sulphurets; coarse gold is frequently met with, and the owners are sanguine that the rock will surrender in the batteries a handsome quantity of the coveted metal. Rock is being hauled to the Bonanza mill, at Drytown, for crushing, so that in a short time we hope to be able to report definitely as to the richness of the quartz.

PHENIX.—The Phoenix mill is crushing 170 tons of ore per day. The rock has all to be hoisted out of the south shaft, as it will require another three weeks to sink the sump in the north shaft.

CALAVERAS.

GRAVEL MINING.—Calaveras Chronicle, Feb. 6: We have no new developments in gravel to chronicle, but the situation is encouraging. In the first place, there is an abundance of water, and secondly, good use is being made of every drop of it. All the hydraulic and tunnel claims are running full-handed, and although no clean-ups have yet been made this season, the outlook is extremely favorable. Several new claims have been opened since the rains set in, and considerable prospecting is now being done. More claims are being worked in this vicinity at present than during any other season for the past 10 years, and the prospects were never brighter for good returns. No other section of the middle or southern mining counties can begin to compare with this in extent of gravel mining operations, and work was never before pushed so vigorously here as this winter.

RICH QUARTZ.—In the neighborhood of 100 tons of quartz from the San Bruno mine, at Mosquito, was crushed in Garland's mill. The rock was rich. Exactly how much the average yield per ton was we don't know, but it didn't vary much from \$60. With the new machinery in place work on the mine is progressing finely.

NEW HOISTING WORKS.—The Buena Vista mine at Railroad flat, owned by Roentgen, Sundermeyer & Co., has resumed operations. The new hoisting works, designed and erected by Mr. J. S. Swank, are of the most substantial character—a model of strength and convenience. The motive power is a hurdy gurdy wheel, running under 120 feet pressure. The water is raised from the mine by a six-inch improved plunger pump, manufactured by S. N. Knight, Sutter Creek, Amador county, and is the most complete working pump for sinking purposes in use.

AT THE GWIN.—Moore & Co. had to stop work on account of the recent rains. Their lead is south of the Gwin mine on the same lode. Dodge & Co. are pushing things ahead. Shaft 100 feet deep and an excellent quality of asbestos. Seaver & Co. have commenced work cutting a ditch from the main canal to French bar to start a hydraulic. The company will have one of the largest claims in the county.

MOSQUITO ITEMS.—The San Bruno is owned by Kellogg & Co., of San Francisco, W. H. Rodda, Esq., Superintendent. This mine has had a thorough renovation, new pumps, new engines and a new crew of men to work it. Result—a crushing of 91 and over tons, which paid in the neighborhood of \$60 per ton. Blue Jay, owned by H. W. Potter & Co. Vein, five feet wide, and the rock taken from this mine is A 1. Jack Donovan, the underground foreman, tells me it will go at least \$130 per ton. Peter Gass mine is sold, by J. J. Holmes, Esq., to San Francisco parties; price paid, \$2,000. John, the Butcher mine, owned by Butcher John, Breto & Co., have their tunnel in about 60 feet. Men are now driving tunnel and stopping. Between 50 and 60 tons of rock on yard, that will pay about \$60 per ton.

EL DORADO.

THE KEEGAN MINE.—Mountain Democrat, Feb. 9: Superintendent Wickham is pushing the tunnel right ahead at the Keegan mine. The greater part of the past week has been spent in clearing out and timbering the tunnel.

This being completed, the tunnel will be pushed through the hill as rapidly as possible. A force of men is also kept at work on top of the hill, sinking the shaft.

AT WORK AGAIN.—On account of the scarcity of water, caused by the freeze, a few weeks back, work was suspended at the Placerville mining company's hydraulic claim, on Sacramento hill. About two weeks ago water was again turned on and the mine is now being more vigorously worked than ever.

RICH.—It is now a pretty well settled fact that Mr. Hallock, who some time ago purchased the old True mine, in Big canyon, has struck it very rich.

BAD CUT.—Last Thursday morning, Henry Herrill, son of Mr. Eli Herrill, of this city, went to work at the Excelsior mine, Coon Hollow, and a little before noon, of the same day, a rock fell from the bank, striking him on the head, causing a very painful, though probably not serious wound.

FRESNO.

NEW MILL.—Fresno Republican, Feb. 9: The G. M. Co. recently erected a five-stamp mill at their mine in Fine Gold gulch, in this county, and made a very satisfactory trial run of three days, crushing 33 tons of quartz, which yielded a little over \$1,500 in bullion. The mill is run by a turbine water-wheel. The Co. have about 80 tons more of the same quality of quartz on their dumps, but owing to the recent heavy rains which render their new road very soft, they deemed it best to defer hauling ore over it until it settled a little. The main shaft is down 100 feet, and they now have ten men employed in running drifts, preparatory to stopping out ore. They have a large quantity of fine ore in sight, and the prospects of a valuable mine are very flattering. The copious rain fall is stimulating our mining interests to an unusual degree, and we have intelligence of lively business in prospecting, both in quartz and placer mining, in the foothills of the Sierras in this county. There is no question but Fresno county is rich in precious metals, and will at no distant day take rank with the paying mining counties of the State.

INYO.

NEW DISTRICT.—Coso Mining News, Feb. 9: A new district has been formed for the section of country where the late gold discoveries were made and is called "Beveridge." A Recorder has been elected and by-laws adopted. The mines are situated about 16 miles northwest from Cerro Gordo, on the eastern slope of the Inyo mountains, nearly opposite the Eclipse company's mines, which are on the western slope. The ledges are said to crop boldly and are traceable for a long distance. At present the easiest way of reaching the mines is by way of Cerro Gordo. From that place keep along the mountains to the mines.

BULLION SHIPPED.—On the 3d inst. the Emigrant company shipped, per Wells, Fargo & Co.'s express, 170 pounds silver bullion, valued at \$3,000, and on the 7th inst. the Sheldon company shipped gold and silver bullion, valued at \$2,000. To-day the Emigrant made another shipment of 173 pounds, valued at \$3,200. Total for the week, \$6,200.

NEVADA.

CRUSHING.—Grass Valley Union, Feb. 12: Another crushing of 60 loads of Centennial rock is being put through at the Orleans mill. It is believed it will go \$200 to the load. The ledge in the mine continues regular, and although small in size, it is very rich—and what is more satisfactory, it does not run to specimens.

The hydraulic miners of this county have all been busily at work for a week or more, but yesterday's snow storm will prove troublesome in the upper portion of the county by choking the ditches and checking the flow of water. When a ditch becomes choked with snow it sometimes involves immense labor in clearing it out, as the snow has to be shoveled out for miles.

GOOD ROCK.—Nevada Transcript, Feb. 9: We understand that Ebaugh and Lowey, whose quartz claim is near Kitts' mill, Willow valley, are taking out some splendid rock. The last crushing yielded \$2,400, or about \$55 per ton. The quartz mines in that section are looking better than ever before, and the prospects are good for the discovery of many valuable ledges. Previous to the storm, a large amount of prospecting had been carried on, which will be continued as soon as the weather is favorable.

DEADWOOD MINE.—The topic of conversation in town, yesterday, was the rich strike in the Deadwood mine. The owners have done some heavy work in the mine, believing that it was only a matter of time when a fine ledge would be uncovered and they would be fully repaid for the money they were expending. On Thursday evening last they found a ledge 20 inches in thickness, and the rock will go into the hundreds of dollars per ton. Work is being rapidly pushed ahead and in a short time the true value of the discovery will be demonstrated.

MURCHIE.—Nevada Gazette, Feb. 9: Stems for the Murchie quartz mill were being hauled to that place yesterday. They have been taking out large quantities of first-rate ore since the erection of their hoisting works, about a year since, consequently the erection of additional stamps to their present number.

PLACER.

IOWA HILL ITEMS.—Cor. Dutch Flat Forum, Feb. 7: The late rains have filled the old ditches and washing in every direction has commenced in earnest. Water was also expected to reach the big reservoir of the canal company last

week. The new cement gravel mill at Wisconsin hill is about completed, and will commence operations immediately. It is very simple in construction, being nothing more than a cylindrical tube, set on a slight grade, 30 feet long, with four-inch iron bars equidistant. As the cylinder slowly revolves, the fine dirt and gold fall between the apertures of the bars into the amalgamators and the large rock rolls out at the lower end. It is held that 200 tons a day can be worked. If so we do not see how it can be a failure; the percentage per ton which it is held will yield a profit, being so small that it must succeed. The crack Orion claim (nine shares) is reported sold to San Francisco men for \$30,000. It will cost \$6,000 to put the claim under the pipe. The price is considered a good evidence of a rise in the value of our mining ground of the district. But, it must be remembered, such sales could never have been made, or such prices obtained, if it had not been for the construction of the Iowa Hill canal. By and by more sales like this will be heard from. The discovery in the old Damascus claim proves to be a new development, even more extensive and rich than first anticipated. It is now opened at several different points west of the old tunnel, and shows equally well in each.

SISKIYOU.

EMPIRE.—Yreka Union, Feb. 9: The Empire Co. have decided to build their mill on the bank of the Klamath river, between Chris. Aroe's house and the Centennial Bar claim, and expect to have it in running order by the first of June next. This will necessitate the building of a road about one and three-fourths miles in length from the mill site to the mine, and work on which will be commenced immediately.

GROUND sluicing is now being proceeded with vigor in nearly all placer claims in the county.

THERE will be claims worked this year that have lain idle for a long time for want of water.

ON Sunday night the waters of Humbug creek, broke through the head dam of the Big Flume company, on Humbug, and nothing but the utmost exertions of all the men saved the claim from being filled up.

THE raise in the Klamath river on Sunday necessitated the taking out of the wheels and pumps in the Pacific claim, formerly known as the Clark claim, in the Klamath river, at or near the mouth of Humbug, and consequently all the work is stopped for awhile.

WE learn that Cornish & Co., have about 100 tons of quartz on the dump of their mine, and that the ledge looks very favorable. It is now about four feet wide, with good looking foot and hanging walls, and the quartz taken out prospects well. The company are having a dump house, to hold 400 or 500 tons, built at the mine. They think of moving their mill up to the mine.

THE organizing of the new mining company for the purpose of mining in Yreka creek, is progressing very favorably, and the stock is being taken rapidly, over 100 shares more having been subscribed for during the week, and we think it will not be long ere the remainder of the stock will be all taken and the enterprise be under full headway. It is proposed to call the company the "Lucky Baldwin."

TUOLUMNE.

PHENIX RESERVOIR.—Union Democrat, Feb. 9: Owing to the heavy rains, especially on Wednesday night, great fears were entertained that the dam of the Phoenix reservoir would be carried away. The flood gates are insufficient in capacity for a very heavy flood. The officers of the water company were doing all that could be to save the structure on Thursday. Should it break, the damage will be serious, not only to the owners, but to a large portion of our mining interests.

Nevada.

WASHOE DISTRICT.

SILVER HILL.—Gold Hill News, Feb. 13: During the first part of the week, east crosscut No. 2, south of the turn-table, in the main south drifts on the 600-ft level, cut through a vein of ore four feet in thickness, careful average sales of which give returns of \$45 per ton. Some of the ore in this vein is very rich, assaying as high as \$200 per ton. The entire four feet has a fine, lively look, and, beyond a doubt, will lead to a much larger deposit when traced to its source.

MEXICAN.—The lining of the pumping compartment of the Ophir shaft has created a draft that has greatly cooled the mine, and has enabled the resumption of work in the face of the west drift from the main north drift on the 1900-ft level.

ALTA.—Sinking the main shaft is making good progress, the bottom in soft vein matter, showing a near approach to the main ledge. Some of the streaks of quartz cut through afford excellent assays of both gold and silver.

SIERRA NEVADA.—The 1800-ft station in this winze is completed and the sinking has been resumed. This is a large double compartment winze, making a complete working shaft, and will now be continued directly downward to the 2000-ft level. It is being sunk at an angle of about 35° and is being pushed downward at the rate of five feet per day.

CALIFORNIA.—Daily yield, 700 tons of ore. The ore stipes on the 1650-ft level going north continue to yield rich ore and show well at every point. On the 1600-ft level the ore stipes are yielding good ore and the south drift from winze No. 3 is still advancing in very rich ore. A drift west is also being run to determine the

width of the ore body at a point opposite the winze, which is now in 34 feet, the face still in rich ore. The ore stipes on the 1550 and 1600-ft levels are yielding good milling ore, with plenty more in sight. The mills are all well supplied with ore and are kept crushing to the full extent of their capacities. The usual monthly dividend of \$2 per share, aggregating \$1,080,000, will be paid on the 15th inst. The present condition of the mine and everything pertaining to it could hardly be better or the future prospects brighter.

OPHIR.—All the force possible were brought to bear to line the pumping compartment of the shaft and create an upcast through one compartment, leaving the other three compartments downcast. Notwithstanding this, the work was not completed and any considerable cooling effect felt in the mine until day before yesterday, when the bulkhead was removed and a new 15-inch air pipe was placed in the south drift, east of the ore vein, and a strong current of air driven in. This is gradually cooling the drift and work was resumed in the face this morning, which is showing some fine streaks of quartz and ore. At the rate at which the air is being cooled on the lower levels, everything will be in good condition for a general advance of work in every quarter of the mine by the close of the week.

BELCHER.—The north incline or drain shaft is down to-day 20 feet below the 2200-ft level, the bottom in good sinking ground. The pumps and rods are all in good working condition down to the 2160-ft station. The south drift on the 1900-ft level is still advancing through quartz that assays from \$10 to \$15 per ton.

UTAH.—The south drift on the 1350-ft level is being steadily advanced, the face still in vein porphyry of a lively, favorable look. The face of the west crosscut near the north line is penetrating more favorable ground, the porphyry being softer, and showing occasional fine stringers of quartz.

BEST & BELCHER.—The joint winze in crosscut No. 1 on the northern boundary line on the 1700-ft level will be a double compartment working winze, and will be sunk perpendicularly to the 1900-ft level, where it will be connected with the north drift now being run from the Gould & Curry east winze.

YELLOW JACKET.—Sinking the new shaft is making excellent progress, and everything is working splendidly. The broken pinion has been replaced by a new one, and now gives no further trouble.

OVERMAN.—Sinking the main shaft is making steady progress, the bottom in hard blasting rock, with considerable flow of water. Sinking the south winze below the 1400-ft level is also making good progress, the bottom being in a fine character of lively vein matter.

UNION CON.—The heat in the joint east drift on the south line, on the 1600-ft level, is not so great, and much better progress is being made. During last Sunday night the face of this drift cut into a fine quartz formation carrying some ore, the whole being intermixed with streaks of porphyry.

HALE & NORCROSS.—The water in the main incline is reduced to-day to a point 20 feet below the 2000-ft level, where it has been held while the donkey pumps were being lowered. These are now in place, and the drainage of the mine will now be pushed ahead with the usual vigor.

LADY WASHINGTON.—The south drift on the 850-ft level has reached the south line, where a winze has been started to connect with the north drift on the 1000-ft level of the Justice mine. The bottom of this winze is in excellent quartz and ore.

CON. VIRGINIA.—Daily yield 600 tons of ore, which is being crushed as fast as it is extracted. The surplus supply of ore at the mills continues to hold out, and the ore stipes in the mine show well in every part. On the 1650-ft level the stipes going south could hardly look better, while on the 1550-ft level they continue their usual yield of rich ore. The 1500, 1400, 1300 and 1200-ft levels all have exposed ready for extraction many thousands of tons of rich ore. The yield of bullion for the month of January was \$1,613,162, and the usual monthly dividend of \$2 per share, aggregating \$1,080,000, will be paid to the shareholders to-morrow.

JUSTICE.—Daily yield 85 tons of ore, which is being crushed at the Pacific mill as fast as it is extracted. Average assays of the pulp from the batteries range from \$38 to \$45 per ton, showing a very favorable increase in the value of the ore extracted. The ore stipes are showing well on both the 1000 and 1150-ft levels, and it is believed that a still greater increase in the value of ore milled will be made in a very few days. The northwest drift on the 1000-ft level is steadily advancing, the face in ore, an average assay of which, made yesterday morning, gave a valuation of \$45 per ton.

BULLION.—The bottom of the incline shaft and the upraise are now only about 70 feet apart. The north drift on the 2000-ft level is being steadily advanced, the face in an improved character of vein matter mixed with quartz affording low assays.

CALEDONIA.—The north drift on the 1500-ft level is steadily advancing, the face in porphyry and quartz.

SUTRO TUNNEL.—Total length of tunnel to-day, 13,931 feet. The number of feet driven during the past week was 51. The flow of water from the mouth of the tunnel is 1,286,500 gallons per day. The temperature of the air at the header is 108°. The ground in the face has every appearance of vein matter.

GOULD & CURRY.—The upraise from the

1900-ft level to connect with the bottom of the incline, is being forced vigorously forward.

COS. IMPERIAL.—The north drift from the station at the 2400-ft level is being steadily advanced in quartz and vein matter of a fine character. The quartz affords low assays.

NORTH COS. VIRGINIA.—The west drift on the 1300-ft level is making excellent progress, the face in a splendid character of soft birdseye porphyry.

SAVAGE.—The water is reduced to-day to a point 25 feet below the 2000-ft level. The complete drainage of the mine appears now to be a matter of a very short space of time.

CROWN POINT.—Daily yield, 60 tons of ore, from the old workings on the 160-ft and 230-ft levels. Sinking the winze below the 2000-ft level is making excellent progress.

STEELE.—Sinking the main shaft is being pushed ahead with steady vigor, the bottom in soft porphyry of a lively character, carrying occasional streaks of clay and quartz.

LEVATHAN.—Sinking the main incline is being pushed vigorously forward, the bottom being in fair working ground. It is now down 11 feet below the 600-ft level. The shaft is being thoroughly timbered.

EUREKA DISTRICT.

MINING NOTES.—Eureka Sentinel, Feb. 6 to 11: During the last five days \$52,000 in crude bullion was shipped from here. The Richmond company's three furnaces turned out crude bullion last week valued at \$95,000. The newly discovered ore body on the 450-ft level of the Hamburg is attaining large proportions. The Richmond furnaces are reducing an average of 50 tons of ore each per day. The cave at the Connolly mine has had the effect of retarding ore shipments. They will be resumed as soon as the debris is hoisted out of the mine. The four calcining pans at the Richmond refinery are in full blast and working up to their utmost capacity. The Hoosac company employs 14 miners at present. The flow of water into the K K mine, when the pumps are running, will average 100,000 gallons per day. The ore bodies on the third and fourth levels of the K K mine are furnishing sufficient ore to keep the furnaces in steady operation. The bullion tax for the last quarter will amount to \$23,000. This source of revenue is a financial bonanza to Eureka county. The Selby reduction works, of San Francisco, refine the bulk of the crude bullion shipped from this point. Some 2,000 tons of Eureka lead has been shipped to China in the last two months. Part of this was from the Richmond, and the balance from Selby's smelting works. Thirty-one car loads of crude bullion, three of fine dust and six of refined lead, were shipped in the past five days.

Arizona.

PLACERS.—Arizona Star, Feb. 7: We have been shown a piece of ore lately extracted from the Esperanza, assaying into the thousands. All that this mine wants is some capital to work it systematically to develop it into a lucrative property, perhaps into a bonanza. Mr. R. H. Stretch, a mining engineer, is now on his way to this city to examine the property.

DRY WASHES. several in number, have passed through Tucson, en route south to the placer diggings, since our last issue. Prospectors have given the owners favorable reports, and should they be successful it will open up a large and paying business for southern Arizona.

MOUNTAIN SPRINGS.—Arizona Enterprise, Feb. 7: Mr. Gorton arrived here recently from a trip through southern Mohave and western Yavapai. He found everybody busy on and around the McCrackin mine. A gentleman named Wilson is erecting a furnace in Mount Spring district, which is about 60 miles this side of Signal City. This district has several promising silver lodes.

CASTLE DOME.—Arizona Sentinel, Feb. 9: The Arkansas mine has been sold by Lige Bettis to Bagley, McPherson & Pickens, of San Francisco. This firm has lately been picking up several good properties in this county, at great bargains. No lead has been taken out of the Arkansas below 100 feet, except what was hoisted in sinking two shafts about 80 feet below that point. All the lead that has been shipped from this mine has been extracted from near the surface, and from a mere fraction of the claim. The metal is continuous in the shafts and widest near the bottom. The last 80 feet have disclosed more lead than was shown by the first 100. The new owners have secured a valuable property. Mr. Williams was here this week, and reports very well of the mines he is working, as well as others in the district. Talk is cheap, and it has become a custom to lavish a good deal of it on mining prospects. But one fact is significant, which is this: When any miner now at Castle Dome draws an order on our Yuma merchants, that order is paid on presentation. The miners of that district have no very big assays to brag of, but they weigh their products by the ton and not by the ounce. Silver is well enough, but it takes no Act of Congress to make a market for Castle Dome lead.

Idaho.

ROCKY BAR.—Cor. Owyhee Avalanche, Feb. 3: During the last few days we have had the most severe snow storm of the season; hlocking up the roads everywhere in the mountains.

MINING AFFAIRS ON BEAR CREEK are living up considerably. The Vishnu boys are going ahead splendidly, developing as usual with excellent results. Northeast of the Vishnu about three-fourths of a mile, Harrington, Fitzgerald and

Callahan are running a tunnel to tap what is known as the Mountain Buck lode. On the surface and to the depth of 30 feet the ore from this mine yielded handsomely. The new tunnel is being started on the north side of the hill for the purpose of cutting all the ledges north of the Mountain Buck. Already one very fine vein of quartz has been cut that prospected well in gold. The owners have about 75 feet further to run before intersecting the main lode. Andrew Kramer owns and works the Siara and Chaney mines, eastern extensions of the Idaho and Vishnu lodes. He is running the Montana tunnel which intersects the Siara 400 feet from the mouth of the tunnel. With about 80 feet further tunneling the Chaney mine will be intersected. Supt. Rollins commenced sinking a winze from the present level of the Confederate Star, intending to go down about 75 feet. This is for prospecting purposes. Mr. Rollins will commence in the spring to sink a shaft 500 feet deep on the Elmore extension. This is one of the honest companies of Alturas. They are deserving of success. I am informed that Thomas L. Johnson and Henry Hesford struck it rich in the Idaho Bonanza situated close to the old Alturas mine. Another rich strike is reported in the Red Warrior district, made by Mr. Henry Wakefield on the Frenino or close by it. There is quite a number of miners working for themselves in that district and are doing remarkably well. Favorable reports come from Atlanta. The Buffalo Co. have completed the first 100 feet of their working shaft below the present level, and are continuing down another 100 feet. Jones, Davis & Co. are prospecting on the great Thkomo lode, it being 100 feet from wall to wall. Pay ore is found the whole distance. Wm. Doolin, James Newton & Co. are doing well on the Last Chance mine. Thomas & Co., of the Canora mine, are running the ten-stamp mill of Colonel Mattingly night and day. The Monarch and Buffalo mills are continually reducing ore and large quantities of bullion from those mills are passing through here weekly—a very good indication of the wealth of Atlanta.

CHARIOT.—The Golden Chariot is looking well, and the prospects are much more encouraging at the 15th than they were on the 13th level.

POTOSI.—At the Potosi a considerable quantity of rich rock is being turned out daily.

BLACK JACK.—The account from the Black Jack mine continue to be very encouraging. The ledge is improving all the time, and the great bulk of the rock taken out, without being assorted, will average somewhere in the vicinity of \$50 to the ton.

The Jones mill near Wagontown is running on Lepley rock. The last crushing from the Webfoot turned out quite well.

FAVORABLE SEASON.—Idaho World, Feb. 5: Miners on the other side of the Basin are confident of a good placer mining season this year, as the ground is thoroughly soaked and considerable snow on the mountains.

The Belshazer mine, on Fall creek, is looking fully as well, if not better than ever before.

Oregon.

MONUMENTAL SILVER MINE.—Oregonian, Feb. 2: But little has been published concerning the progress of work on the above mine since the company had one and a half tons of ore worked in this city, making a silver brick of the value of \$812. The work done since has been in driving the tunnel. It will be remembered that the shaft sunk on the Monumental mine was at a depth of 115 feet. The tunnel was commenced at a distance of 582 feet from the shaft to strike the ledge at 300 feet. In the progress of this tunnel four ledges have been cut, all good ore. When the tunnel was in 486 feet, the air was such that more ventilation was necessary and a full force of men were put to work in sinking an air shaft, which was commenced on a ledge 435 feet from the mouth of the tunnel. By working both from above and below, this important feature was completed on the 15th inst., thus affording fine ventilation and enabling the work, both in the tunnel and drifting on the ledges, to proceed more rapidly. Advice was received at the office of the company here, November 27th, that the tunnel had just cut a ledge of ruby silver ore, one foot wide, and yesterday a dispatch was received from C. S. Miller, Superintendent, that the tunnel had cut another ledge of good ore. This ledge is but 75 feet from the Monumental ledge, which, with the progress now being made, will speedily be reached. The richness and extent of the Granite creek quartz region is in a fair way to be demonstrated and establish the fact that Nevada does not contain all the silver on the Pacific slope.

VIRTUE.—Owyhee Avalanche, Feb. 9: M. Hyde, Esq., writes us from Baker City, under date of January 31st: "The Virtue mine will start up in full blast as soon as the Cornish pump, now being built in San Francisco, arrives here. I just cleaned up \$9,000, the result of 12 days' run on rock taken out by men working on tribute. I have recently purchased what is known as the Green discovery mine and mill at Rye valley for the sum of \$14,000. This is a good property, and everything will be put in running order by the 1st of May." From information from other sources, it looks as though eastern Oregon had good prospects for the coming season, and that the mining yield will be greatly in excess of what it has been for years past.

Utah.

BIG COTTONWOOD.—Salt Lake Tribune, Feb. 10: Five feet of snow fell this last storm in Big Cottonwood. The Reed and Benson ships high grade ore. They have struck a fine body

in the lower works and are moving ore every day. The Carbonate has been worked under difficulties. Every morning the men have to go from the mine and shoot away the comb or crest of snow that drifts during the night. This carries with it a huge slide and clears the trail, then the men from below begin to move up. The large log cabin at the Emperor, or Groesbeck tunnel, was swept away by a snowslide the other day.

DRY CANYON.—There are a good many prospectors waiting for the snow to clear off a little in order to turn out some more bonanzas. The sinking of the main shaft on the Mono continues, and very high grade ore is being extracted. Mr. Clark, the manager, is confident the Mono will ere long be the mine it used to be.

BINGHAM.—The ore shipments over the Bingham railroad for the week ending Feb. 7th, were 941,741 pounds. Hlans & Co., made a large shipment from the old Ten-Forty on Friday last. A tunnel is being run on the Jordan vein by Prof. Holden. It is in about 350 feet now. Shipped yesterday from the Revere leaching works, Bingham, about \$2,640 worth of leached silver. The Shettle Bros. made a shipment of \$80 ore last week from the Cresus. The snow retards the work some. Thirty feet more and the Steamboat tunnel will be in the ledge. Watson & Ireland are now in pay gravel in their shaft, but are not yet on the bedrock. They have taken hold of Bingham's rich placers with improved machinery, and are going to make money this spring. The ledge was struck in the Greeley tunnel last week. The vein is 14 feet wide, in which is a streak of ore assaying 77 ounces in silver and 56% lead. The tunnel is in 500 feet and taps the ledge at a depth of 300 feet. Donahue & Wooster struck rich gold in the Bulldozer. This mine is near the Saratoga, and a relocation of the oldest mines on that hill. The vein is supposed to be a continuation of the Steamboat and is the richest ore of its class ever struck in Bingham.

PARK CITY.—The Ontario mine shipped for the week ending, Feb. 9th, 27 bars, valued at \$39,539.22.

ALTA.—Ore is being piled on the Butte dump. The Toledo folks are piling up ore and shipping when the trail is good. The Iris Tunnel Co. are to start up in the spring with improved machinery. Charley Reed ships about 300 tons a month from the Alta Con. There was shipped over the Alta tramway, for the week ending Feb. 6th, 713,350 pounds of ore. The old Emma continues to make some nice shipments. The Flagstaff is running as usual.

OPHIR.—Teams will commence hauling ore in a few days for the leaching works. Considerable fair grade ore is being shipped from the Nevada tunnel.

SANDY AND WEST JORDAN.—Three stacks are running at the Mingo works. All the sampling works are busy handling ores. The Big Cottonwood smelter, owned by the rustling Ben Morgan, is running regularly on Cottonwood and Bingham ores. The old Telegraph smelter is running on the Jordan. It is the intention to work up all the material at the works and then shut down unless the lead market is brighter.

News in Brief.

THE pay-roll of the Suto tunnel company is \$10,000 per month.

THE miners in the Savage mine can hear the blasts in the Suto tunnel.

THE Black Sand mining company, organized to gather the gold from the sands of the Oregon coast, has filed a petition in bankruptcy.

AT the annual meeting of the Pacific Rolling Mill Company, William Alvord, L. B. Benchley, B. P. Brunner, Lonis McLane and D. O. Mills were elected Trustees for the ensuing year.

THE Grand Prize protests against the issuance of a patent to the Grand Prize West company. The machinery of an iron foundry is real estate, according to Judge Allison.

THE bullion shipment from Tuscarora was only \$8,100 last month. The falling off being due to the extreme cold weather, by which water pipes, springs, etc., were frozen up, causing a stoppage of the mills.

THE House Committee on Education and Labor have agreed to report a bill to distribute the proceeds of sales of public lands among the several States for the purpose of education. Details of the bill will be arranged by the Sub-Committee to whom the subject was referred.

THE railroad lines leading out of Chicago to the East report that they have shipped, the last week, to Eastern points, 53,000 tons of flour, grain and provisions. This represents 5,000 loaded cars. Trade is so active that on some lines a sufficient number of freight cars cannot be secured.

THE startling falling off in the revenues of the Government has been noticed by the Treasury officials within the past few weeks. The rate of decrease is such as to excite serious apprehension that if it continues, special legislation will be required to make provision for the current expenses of the Government.

A BILL introduced by Senator Eaton (by request), in furtherance of Civil Service reform, proposes to empower the President of the United States to detail for such duty as he may deem expedient retired officers of the army, navy and marine corps, who may apply to him for employment in the following branches of Civil Service, namely: Indian and Pension Bureaus, diplomatic service, life-saving service; said officers to receive while performing such duty the full pay and allowance of their rank, and no more.

THE Prince of Wales has entertained Stanley at dinner.

SOLEMN masses for the dead Pope have been held all over the country.

LARGE numbers of persons are still being fed at the churches in this city.

THE beet sugar refinery at Isleton has closed down for the season.

THE miners in the Savage mine can hear the blasts in the Suto tunnel.

CLAUDE BERNARD, the eminent French physiologist is dead.

GIDEON WELLES, ex-Secretary of the Navy, died at Hartford, Conn., on the 11th instant.

FOUR McPHERSON, Nebraska, was burned down on the 11th instant.

WM. WELSH, President of Girard college, died on Monday last.

SEVEN burglars were captured on Sunday, in a low grocery on Jessie street.

SOME 250 recruits for Gen. Miles' command have gone to Fort Buford and Tongue river.

THE building belonging to the Albany (N. Y.) Times was burned on Sunday. Loss, \$200,000.

THE President has appointed William A. Howard, of Michigan, Governor of Dakota.

STANLEY was entertained by the Royal Geographical Society on Saturday evening.

A PRISONER named Wallace walked out of the Municipal Court room of this city, this week, without being discovered.

MONTGOMERY QUEEN, of circus notoriety, has filed a petition in bankruptcy in New York. Liabilities, \$166,000; nominal assets, \$31,223.

A NUMBER of the overdue coasting vessels have arrived in port, after having experienced heavy gales. Several are yet to be heard from.

AN armed body of men prevented a delinquent tax sale in Steuben county, New York, on Monday.

NEARLY 1,400 free lunches were provided to the poor in the churches last Sunday. A great many families had food supplied to them at their homes also.

IN consequence of an urgent order received at Chatham Dock Yard, the whole force, numbering 4,000 men, will begin working extra hours to complete vessels in hand.

CRAIG, M. CONRAD, Member of Congress, United States Senator, and Secretary of War under President Fillmore, died in New Orleans on Monday, aged 73.

A SERIES of deep sea researches after the manner of the Challenger investigations, is to be instituted toward the close of next year, in the Bay of Bengal and the Indian ocean.

THE contested election case of Wiggington vs. Pacheco, has been decided by the House in favor of Wiggington, so that Pacheco has been unseated.

A STRONG tidal wave has swept the coast of Peru. The Callao mole has been severely damaged. There was not a ship at the guano deposits.

THE persons who became sureties for Knight, Wellock, Kearney and others, have been relieved of their obligations by Judge Fernal, who has allowed the accused to go on their own recognizance.

THE President has nominated Charles Silent, of California, to be United States Associate Justice of Arizona Territory, in place of Judge Tweed, whose term of four years is about to expire.

SENATOR PIERSON has introduced a bill appropriating \$25,000, to be used with a like sum donated by H. D. Bacon, for constructing on the State University grounds a Library and Art College.

NEWS from Cape Town says: A general advance was made against the enemy January 15th, which was completely successful. Ten thousand cattle and fifteen thousand sheep were captured. The Kaffirs lost heavily. Transkel is completely cleared of the enemy.

THE Postmaster-General has issued new rule. Postmasters for small towns and for country districts will hereafter be appointed on the recommendation of the Postmasters of the largest neighboring cities. Some Western Members of Congress feel indignant at this loss of patronage.

THE bill introduced in the House by Robertson, to improve navigation and to afford protection and security to shipping, trade, commerce and alluvial lands of the Mississippi river, provides for an appropriation of \$6,500,000 for that purpose.

UP to Saturday there have been introduced in this Congress 3,940 bills and joint resolutions, only ten of which have yet become laws. Four-fifths of them were introduced by members of the House, and of the entire number more than one-half are pensions and private relief bills.

SECRETARY SCHURZ has affirmed the decision of the General Land Office in the matter of survey of the Jarupa Rancho, comprising 39,000 acres of land in San Bernardino county, confirmed to Abel Stearns. This decision approves the recommendation made by the Surveyor-General last October, for the erection of southern and eastern boundaries.

THE Territorial Delegates have adopted this resolution: "That the Committee on Public Lands of the House of Representatives be respectfully requested to report House bill No. 2,442, introduced by Maginnis, of Montana, to regulate the cutting of timber on public lands in Territories, with a favorable recommendation, as, in our relief, said bill is well adapted to furnish such relief as the people of the Territories require; and that its passage ought not to be jeopardized by being attached to or connected with other proposed legislation about which there may exist serious differences of opinion."

Estimation of American Scientific Work Abroad.

The writer of the following letter was for some years connected with the Geological Survey of California under Prof. Whitney, and subsequently spent four years in the exploration of the interior of China. He is now President of the Royal Geographical Society of Berlin, Prussia, and deservedly ranks among the most eminent geographers and geologists of Europe.

F. V. Hayden, Esq., Chief of Geological and Geographical Survey of the Territories:—MY DEAR SIR: I have to thank you for so many of your splendid publications, which you so kindly have sent me during the last months, and which make me now the owner of nearly all that has been published of the "Survey of the Territories." Long ago I ought to have expressed you my most sincere thanks, but the saddest of family events have left me little time lately for either scientific work or correspondence, and I am in arrears with nearly everything.

I hope to be able some day or other to go with the necessary care through the wonderful amount of discovery, information and knowledge, which is stored up in your volumes. But the hasty perusal even, to which I had to restrict myself till now, has been to me the most lively interest. Since the time when I made some geological rambles on the Pacific coast, I have never ceased to follow with admiration, the course of your researches. Ten years have passed since. I was then well acquainted with the Sierra Nevada, and the eminent work of Prof. Whitney and his survey had extended some way beyond it. But I looked vainly for good and thorough information on the vast regions extending thence to the eastern slope of the Rocky mountains; for, notwithstanding the grand publications of the Pacific Railway expeditions, the backbone of the continent and the region adjoining it, which appeared to claim, geologically and geographically, a paramount interest, were then little more than a terra incognita.

But you had already commenced to lift the veil from the easternmost part of that region. I recollect with pleasure the interest with which I learned, first from Prof. Whitney, and then by some publication, your progress and your results. Yet I did little expect that within a decade, you would have unravelled the leading topographical and geological features of so many thousands of square miles, from the northern limits of the United States down to New Mexico. Your eminent exploring work, the energy with which you have conducted it, and your faculty of managing the working power of a large staff so as to arrive at its full efficiency, and to put every man at his proper place, have earned for you the admiration and praise of the scientific world in general, and many eminent men in particular. I hope you will allow me to join the number of these and, although my opinion may be of little weight, to give you my thanks, both as a geologist and geographer, for the immense addition to substantial knowledge, which we owe to your survey and to yourself as its skillful leader, and also to congratulate you to the uncommon merits which you have won for your own country.

You are, to be sure, in an enviable position in America, as compared with most countries of Europe, inasmuch as you have unknown and deeply interesting tracts of country, as it were, within doors. But it is one thing to enjoy these facilities, and another to bring them to account. I believe I am correct in the opinion that it is chiefly your merit to have given the impulse for the scientific exploration of these tracts of country which are lying back of the agricultural and long since settled regions, and it certainly is your merit to have enlisted for the execution of this grand enterprise a body of skillful men and proficient scholars. With their assistance your survey has probably brought wider regions into the realm of scientific knowledge than has ever been done before in any single case and in an equal space of time. Having gone over many thousand miles of untrodden ground myself, I am fully aware of the difference which there is between a hasty reconnaissance along certain lines and an efficient exploration which, on the basis of good topographical work, embraces all branches of natural history.

If I desire to express my profound admiration to yourself and your fellow-laborers for the untiring energy with which your work has been conducted, as well as for its wide scope and grand results, an equal homage is due to the enlightened government which has furnished, with an uncommon liberality, the means for carrying out the exploring work and for publishing its results in a magnificent style. As on so many previous occasions, it has given proof of its appreciation of the value and practical usefulness of science; and, indeed, the amount of money spent is small as compared with the advantages that have been gained.

In the interest of science at large, as well as in that of your great country, I hope that you will be enabled to continue your survey on an undiminished scale for a long time.

You will have received, some months ago, my first volume on China. I am looking forward with interest to the mode in which the Loess problem will be finally solved in your Territories, and whether you will approve my theory respecting it. Believe me, yours very truly,

B. V. RICHTOFEN.

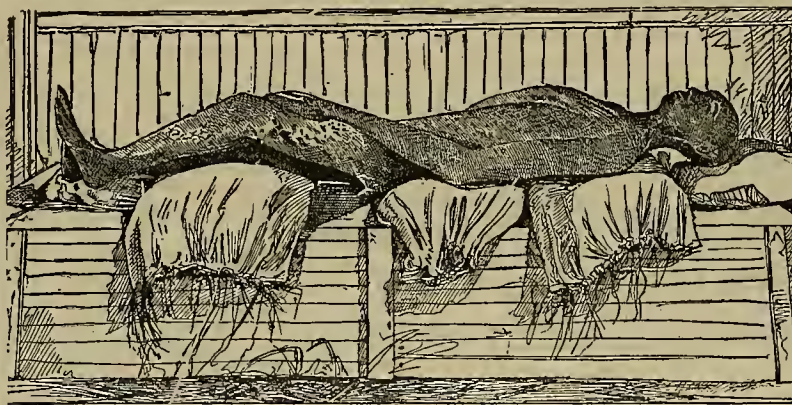
Berlin, 36 Magdelburger strasse, Dec. 30th.

A Rain Gauge.

EDITORS PRESS:—What is a rain gauge? I measure the rain in a lard-tin. I had, during the storm of January 15th and 16th, fully six inches of water in it. The total for the season, to January 21st, was 9.90 inches.—W. PRIFFER, Saratoga, Santa Clara county.

Our correspondent's lard-tin will give a measure of the rainfall accurate enough for all practical purposes, although it is liable to some errors, because the vessel may not be exactly "true" in sides and bottom. According to exhaustive researches, carried on for 15 years, by Mr. Symons, of London, and summarized in Johnson's new encyclopedia, it appears that for a standard gauge, the collector may have any diameter from three inches up to three feet, but a diameter of eight inches is preferable. It must be of thin sheet metal and of cylindrical form and have its axis truly vertical. The mouth of the collector should be horizontal and not less than one foot nor more than three feet from the surface of the ground. A uniform height of one foot from the surface is preferred. Gauges set upon buildings are objectionable. According to Reclus, in his masterly work, "The Ocean," it has been ascertained that the quantity of water falling on the terrace of the Paris observatory building, at 91 feet high, is always less than the quantity of water collected in the courts situated below. At the summit of the building the annual depth of rain is 19.7 inches, while at the base the depth rises, on an average, to 22 inches. At Berlin, the quantities of rain which fell on the roof and in the court-yard of the observatory are a little less, but the difference is also about a ninth. Of course, this rule does not apply to great elevations, such as mountains, for they have altitude to enable them to condense the higher strata of clouds and secure the greater amount of water.

The water collected in a gauge should flow at once into a receiver or holder, with the least possible loss, and where it will be kept safe from evaporation and the quantity should be measured as soon as possible. Some gauges, placed in inaccessible places, are constructed so



THE LATEST FRAUD—THE "STONE MAN" OF COLORADO.

as to allow of measurement once each month. Either the weight, the volume or the depth of the collected water may be measured according to convenience. The usual method is to give only the depth in inches to which the ground is covered by the rain which fell thereon.

When snow falls it is considered best not only to melt and measure that which fell into the collector, but also to dip the inverted collecting cylinder into those places where the snow has fallen evenly and thus take up sections representing the average snow fall. By melting these and taking the average resulting quantity of water, we deduce a better result than could have been given by a single gauging.

Rain gauges should be placed at a distance from trees, fences, buildings or other local disturbing causes.

RICHMOND DISTRICT.—Richmond District is situated about 15 miles north of Palisade, in Eureka county. Regarding its prospects, the *Times-Review*, of a late date, has the following: J. C. Howerton, returned, a few days ago, from Richmond district, where he had been spending a week or two, looking after his mining interests there and taking a general survey of the country. He says there are about a dozen men living in the district, which was formerly known as Mud Springs. But little work has yet been done there, and, of course, nothing definite can be stated in regard to the merits of the mines, although, for the amount of prospecting done, the developments have been most favorable. Twenty-five feet is the greatest depth that has been reached on any of the ledges. The ore near the surface is carbonate and resembles the surface ores of Eureka district. The Aborigine mine, owned by Mr. Howerton, showed on top only a seam of about four or five inches of carbonate ore; but, at the depth of eight feet, has increased to over two feet of a well-defined ledge, a good portion of which is good milling ore.

WITH the exception of the Raymond & Ely, the Eureka Con. mine has produced more bullion than any other outside mine on the coast, and at the rate of the present yield will stand at the head of the list by the first of April.

THE total bullion yield of the Eureka Con. mine, from its discovery to the 31st of December, 1877, is \$8,379,574.

The Colorado Stone Man.

The true story of the Colorado stone man has just been revealed, and the whole thing turns out to be a fraud, like the Cardiff giant; in fact it was another sell-off exactly the same sort. This thing is becoming a trifle monotonous, and taken in connection with the deceptions lately practiced with the Indian mounds in Wisconsin, Iowa and elsewhere, shows a very bad state of affairs. Inscriptions have been manufactured on pieces of slate, and placed in different mounds, and afterwards being discovered have occasioned a great deal of wonder, scientific conjecture and self-delusion. The characters of such inscriptions are copied from Runic, Icelandic, Norse, Phœnician, Etruscan, Hebrew, Egyptian, etc. A recent find was a stone tablet in Wisconsin, written in Sanscrit, which is to be sent to the British museum. In Iowa also several cases of mound stuffings have been detected, and altogether the numerous frauds in American antiquities have resulted in so much skepticism that even *bona fide* discoveries are regarded with the greatest suspicion. In the case of this stone man, about which there was so much talk at the time of its exhibition in New York, the plan was carefully laid out and pretty skillfully executed.

It was made at Elkland, a little mountain town in northern Pennsylvania, by George Hull, the maker of the "Cardiff Giant." The facts were made known by E. J. Cox, Justice of the Peace at Hornellsville, on the Erie road, who had a financial interest in the humbug, but was so badly misused by Hull that he felt no longer under obligation to keep the matter secret. All of Cox's statements have been verified by a reporter who visited Elkland quite recently. It appears that Hull rented a farm at Elkland in 1873, and as soon as he was established he built an icehouse, as he called it, in which was constructed an arch kiln of brick. Ground stone,

ant, who was in Barnum's employ. They shipped the giant to Colorado Springs, and then reshipped it as local freight to Pueblo. Hull was absent about six weeks, and on his return said that the giant was successfully planted.

Conant went as a professor in charge of a party in search of geological specimens. He remained to watch the deposit. When Hull returned East he said the giant was just as ready to dig up them as it would be in five years, but that Barnum had gone to Europe and would not be back till August. The lifting of the giant was therefore delayed until Barnum's return, when he went to Colorado, ostensibly to look after his stock farm, and lecture on temperance. His real object was to be near at hand when the giant was exhumed. Hull knew it would never do to have the Cardiff giant man recognized as having anything to do with the Colorado giant; so he assumed the name of George H. Davis, cut his hair short, shaved his mustache, put a hump on his back, and disguised himself as a stoop-shouldered farmer. Cox meantime was getting anxious to know what share of the financial harvest he was to reap, but he could obtain only vague promises from Hull. To make the sale to Barnum, Hull had been compelled to conceal from the showman Cox's knowledge and interest. Cox told Hull he would have his pay or he would talk. Hull returned to Colorado, but the necessity of keeping Cox quiet soon brought him back, and he then conciliated Cox by offering him one twenty-sixth of his own interest. A contract was drawn up to this effect, and Hull then returned to Colorado. When he reached Pueblo he found that Conant, who, as he expressed it, had been fooling with the giant, had broken off the head and one leg. Hull was enraged, and a quarrel ensued. However, the giant was skillfully mended, and the discovery was made according to the plan. Barnum appeared on the ground and offered \$20,000 for the find, which Conant refused with scorn. The people began to laugh at Barnum, and he offered a reward of \$10,000 to any man who would prove that the giant was made by chisel. Then came the test. Barnum paid Prof. Taylor \$100 and his expenses to go out and bore into the giant.

Hull had lent an attentive ear to the talk of scientific men, and was astonished to learn that a kind of crystal ought to be found on boring into the arm of the petrified giant. Hull obtained crystal to correspond, and by sleight of hand exchanged it for the dust of the boring implement, which was first handed to him by Prof. Taylor. When the giant arrived at Quincy, Illinois, Barnum, who was then in Washington, ordered it to be brought to New York, and its subsequent history is known. Cox has received no share of the proceeds of the exhibition, and decided on that account to make his knowledge public.

The enterprise has been a losing one all around, and much surprise is expressed that Barnum should involve himself in this worn-out scheme of humbuggery. The giant was exhibited in New York, at the aquarium for several weeks, but it failed to draw. Conant has gone back to Colorado, presumably in search of other fossils. The giant is now stored among the curiosities of the New York Museum of Anatomy.

Arizona's Prospects.

Arizona is now looked upon as the future great geographical division of our free and immense Republic. And why? Because she is young, rich and open to all who are looking for something new—some opening for business, some "work for idle hands to do." It is known, all over the Union, that Arizona is the possessor of inexhaustible supplies of the precious metals; that through her rich territory more than one transcontinental railroad is, ere long, likely to be built; that, when railroads are built, the trade of a large portion of Mexico will center here. Not alone this: the people of Colorado, California, Utah, New Mexico and a portion of Nevada will be drawn towards the great cities that are sure to grow up here, on or near the line of the grand trunk railroads which are to be. Then will the rich valleys of the Colorado, the Gila, Salt and other rivers be devoted to the production of cotton, corn, oil, wine and fruits of every description; then will her vast forests, her gold, silver, copper, salt, coal and other mines be utilized. Her pastoral lands will then team with millions of domestic animals, while along her streams, factories will be erected and run, making and fabricating almost everything under the sun.

This is no fancy picture, no idle or imaginary dream. The Territory has once borne and supported millions of people and can do so again. The ancient ruins of cities, villages, waterways—traces of once powerful and busy hives of human workers—that are found here and there throughout the Territory, give good proof of these assertions, if other proofs than these already cited were wanted.

Scarcely 15 years have passed since Captain Walker (peace to his ashes), at the head of a few companions, entered the Arizona wilderness, and, like the immortal Cortes and his brave followers, founded the first white settlement here and planted a new civilization, which grew and flourished even when beset by savage foes and neglected by the very Government and people who should have maintained and defended it. The story of the horrors through which the pioneers of this Territory passed is still fresh in the minds of millions of Americans, so we will not repeat it.—*Arizona Enterprise*.

Continued from page 98

the total sum of such purchases and sales.

Monthly Settlement of Controller.

Sec. 19. The State Controller shall make a settlement each month, and as early in the month as possible, with the Mining Commissioner, as required by the Political Code in other cases; and thereupon the Mining Commissioner shall pay over to the State Treasurer all moneys received by him for fees, brokers' percentages and from all sources, to be credited to the General Fund.

Right to Sue.

Sec. 20. Any Board, Exchange or association of brokers, or any person engaged as a broker in buying and selling mining stocks, who may neglect or refuse to furnish to the Mining Commissioner the reports required by sections 17 and 18 of this Act, shall forfeit the sum of \$1,000 for each and every such offense; and it shall be the duty of the Commissioner to institute proceedings forthwith, in any Court of competent jurisdiction, to recover said sum, together with all percentages that may be due from the delinquent party.

Power to Investigate.

Sec. 21. The Commissioner shall have power to investigate all charges of corrupt mismanagement of mining corporations upon the complaint of two or more stockholders; or if he deem the case one of great public concern he may of his own motion make such investigation. It shall be his duty also to investigate all violations of the provisions of this Act that may come to his knowledge, and report those of a criminal nature to the next Grand Jury, in all cases where there is probable cause of guilt. For this purpose he shall have power to send for persons and papers, and to issue subpoenas in accordance with section 599 of the Political Code.

Complete Record.

Sec. 22. The Commissioner must keep and preserve a full and complete record, in a permanent form, of all his proceedings, including a concise statement of all investigations into offenses committed in violation of this Act, and of all examinations of mining properties, or of the books and papers of any corporation.

Payment of Fees.

Sec. 23. The Commissioner shall require to be paid immediately, before the filing of any paper, the following fees in U. S. gold coin:

1. For filing articles of incorporation or other similar document, \$10.
2. For filing the annual statement of any corporation, \$10.
3. For filing any other paper required to be filed by this Act, \$1; provided, the printed statement required to be filed by section 17 of this Act shall be filed without charge.
4. For certifying a copy of any paper, \$1.
5. For administering oaths, \$1.
6. For furnishing copies of documents, 20 cents per folio.

Sec. 24. The Commissioner shall have power to administer and certify oaths for all the purposes of this Act. He shall provide his office with a suitable seal.

Rooms and Furniture.

Sec. 25. The Commissioner may procure rooms for his office, and may provide a suitable safe and furniture therefor. He may also provide stationery, postage, fuel and other conveniences necessary for the transaction of the business of his office. All expenditures authorized in this section shall be audited by the Board of Examiners, and paid out of the general fund. The Board shall allow the expenses of the Commissioner incurred in necessary traveling in the discharge of his official duties, and also the necessary expenses of the investigations required by this Act, upon itemized accounts, duly verified.

Salary of Commissioner.

Sec. 26. The annual salary of the Mining Commissioner is \$5,000. He shall have power to appoint a Secretary, whose annual salary is \$3,000. The Secretary shall furnish such bonds as may be required by the Commissioner, and shall have power to administer and certify oaths. The Commissioner shall also have power to appoint a porter and messenger, whose salary is \$1,200.

Attorney and Counselor.

Sec. 27. The Governor shall, within 30 days after the passage of this Act, appoint an Attorney and Counselor for the Mining Commissioner, who shall be a lawyer in good standing, and who shall receive as compensation an annual salary of \$4,000.

Penalties.

Sec. 28. Any corrupt violation of the provisions of this Act, or any corrupt omission to perform any duty herein required to be performed by the Mining Commissioner, the Secretary, or Attorney and Counselor, shall be deemed a felony, and shall be punished by imprisonment in the State prison for a term not less than one nor more than 10 years, and the offender so offending shall ever after be ineligible to any office of trust or profit in this State.

False Swearing in Returns a Perjury.

Sec. 29. False swearing in any required return or other paper required by this Act, and sworn to in pursuance of its requirements, shall constitute perjury and be punishable accordingly.

Sec. 30. All Acts and parts of Acts in conflict with this Act are hereby repealed.

Sec. 31. This Act shall take effect from and after its passage.

USEFUL INFORMATION.

A Chance for Our Industries in Australia.

The Australian International Exhibition of 1879, seems likely to be of considerable importance. This will be especially true to those engaged in the industries of this coast, for Australia is a thriving trade-neighbor of ours. We should by all means show her what fine manufactures and productions we can furnish to her. Australian papers state that arrangements are in progress for the International Exhibition proposed to be held in Melbourne in 1879, and the scheme has the approval of the Legislative Assembly. The Governor, speaking recently at Stawell, said that the proposal could not fairly be described in any quarter as premature, if regard were had for the wonderful progress which the Australian colonies have already achieved. In 1879 the aggregate public revenue of the several Australian colonies will exceed sixteen millions sterling, while their trade, including exports and imports, will amount to nearly ninety millions in value. In other words, Australasia, as a whole, could already take her place among the 10 or 12 great nations of the world in point of value of their trade and general importance, for there are only seven or eight nations with a larger public revenue than sixteen millions. The three powerful colonies of Victoria, New South Wales and New Zealand have each a revenue and trade which would place them on a higher scale than ancient European kingdoms, like Sweden, Denmark, and Saxony. The single colony of Victoria, with its yearly revenue of four and one-half millions, is already equal in wealth and importance to the kingdom of Portugal, while Melbourne is considerably above Lisbon in wealth and trade. The success of the exhibition, he pointed out, would depend in a great measure upon the cordial co-operation of the mother country and the sister colonies of Australasia. His Excellency further stated that he was in correspondence with the Secretary of State for the colonies, who was anxious to give every possible assistance, and that the presence of the Prince of Wales was all that was needed to render the exhibition a triumphant success. He expressed himself confident that his Royal Highness, if invited by both Houses of Parliament, might be induced to come out to open the exhibition, and he was certain he would be received with enthusiasm.

PROTECTING METALLIC SURFACES.—The treatment of metallic surfaces so as to render them less susceptible to atmospheric and other influences capable of affecting them, has recently been receiving the attention of Mr. George Bower, of St. Neots, Hunts., and he has found that he can attain the desired end by forming a protective film or coating upon the surface of metallic objects by the employment of air or oxygen, or of a mixture of them at an elevated temperature. The metallic objects or metallic surfaces which it is intended to submit to the protecting process are either subjected to heat in a retort chamber or other apparatus which is capable of being heated externally, and also of being wholly or partially closed, and to such retort chamber or apparatus a tube or tubes is or are adapted, in order that air or oxygen, or mixtures of the same, may be allowed to pass over, in, and among the objects contained therein at any desired pressure; or, instead of causing the apparatus to be heated externally, he employs a heated current of air or of oxygen, or of an oxidizing agent composed of mixtures of the same, heated to such an extent as that the objects contained in the apparatus shall become oxidized, and thus become coated with a protective film or covering; or the apparatus containing the objects to be treated may be heated externally, and the before-mentioned oxidizing agents be admitted at the ordinary temperature of the atmosphere. The temperature which he has found to give the best results ranges from a dull to a bright-red heat, whether the objects be heated by the external application of heat, or by the internal application of the heated oxidizing agent. The process is equally applicable to all kinds of iron and steel, and to any combination of them. The operation is continued until a protective film or covering of the desired thickness shall have been formed, and upon the objects being then allowed to cool they are ready for useful application in the arts.

RULES FOR ASCERTAINING REVOLUTIONS OF GEARING.—To ascertain the revolutions of gearing: Rule—Multiply the number of cogs in the driver by its number of revolutions and divide the product by the number of cogs in the driven; the quotient will be the number of revolutions of the driven. To ascertain the number of cogs in the driver, the number of its revolutions and the number of cogs and revolutions of the driven being known: Rule—Multiply the number of cogs in the driven by the number of its revolutions and divide the product by the number of revolutions of the driver; the quotient will be the number of cogs in the driver. So, vice versa, to find the number of cogs in the driven, its required revolutions being given. To ascertain the diameter of cog gearing: Rule—Multiply the number of cogs by the number of thirty-seconds of an inch in the pitch. Example—A pitch of two inches has 64 thirty-seconds of an inch; say the wheel has 120 cogs, 120 x 64 gives 7680 (76 inches and 80-100 of an inch) inches, the exact diameter on the pitch line.

A SUBSTITUTE FOR GUTTA-PERCHA.—The *Polytechnic* says that balata is a new product which has been lately imported as a substitute for gutta-percha. It is the hardened resin of the so-called Bully tree, found on the banks of the Amazon and Orinoco. Each of these trees yield from one-third to one-half kilograms of balata each year. This substance is so similar in appearance and properties to gutta-percha that it is often imported as such. It is tasteless, has the same smell as gutta-percha when warmed, has the same leather-like toughness, but is far more elastic. At 50° C. it becomes plastic and melts at 150° C., hence at a higher temperature than gutta-percha. It is partly soluble in pure alcohol and ether, but completely soluble in warmed turpentine and in benzol and carbon disulphide even when cold. It becomes strongly electrified when rubbed and is a better insulator for heat and cold than gutta-percha and will doubtless soon find an important application in electrolysis. The caustic alkalis and concentrated hydrochloric acid have no action upon the balata, but warmed concentrated nitric and sulphuric acids have the same violent action upon it as upon gutta-percha.

SUGAR BEET VINEGAR.—A writer in the *American Cultivator* says: I do not see any mention made of the value of the juice of sugar beets for the purposes of vinegar. One bushel sugar beets, properly rasped and pressed, will yield five gallons of juice, which, treated the same as cider is, will make a stronger vinegar, of as good but different flavor; and in making cider, one bushel of sugar beets to nine bushels of apples will make a cider superior to apples alone. Every farmer who can raise sugar beets, rasp and press them, will have juice enough to make all the vinegar he needs for his own use and a surplus for sale, and be independent of the off-years for apples in the supply of vinegar. With vinegar at a price it could be made for from beets, its consumption would be increased, as it would enter into many articles of manufacture from which the price now precludes it. When it is found how cheap sugar beets can be raised, and their value for vinegar and food, also their leaves for stock, they will be grown more and then be as staple an article in the market as corn.

VARNISH PUTTY.—Varnish putty, for filling the pores of the wood after the first coat of priming, is made of quick-drying varnish and Paris white; the addition of a little ochre improves it for rubbing down. First-class varnishes stain more easily than the inferior grades. Slight stains may be removed by rubbing the spot with rotten stone and water, and, after thoroughly drying the part, rubbing it with sweet oil, applied by the hand.

GOOD HEALTH.

Boys' Smoking.

Whatever may be said for or against the moderate use of tobacco by adults, says the *Glasgow Times*, there cannot be any question about its prejudicial effect on unformed constitutions. It is, therefore, of public importance that the growing disposition among boys to indulge in "the fragrant weed," even at the cost of nicotine sickness, should meet with every opposition. A Liverpoolian, however, recommends such very summary proceedings under this head, in a letter to a local journal, that one might well ask whether the cure would not be worse than the disease. Having occasion to frequently cross the Mersey, he has noticed that the troops of schoolboys making the voyage during the afternoon generally "sneak into the back of the smoking cabin and at once light their pipes." The simple truth is that the lads who have once acquired a taste for smoking will be sure to gratify it surreptitiously in one way or another. Hence the necessity of striving by every means to prevent the formation of the habit. A great deal might be done in this direction by parents and schoolmasters if they convince the boys that the use of tobacco in early years acts prejudicially on physical strength. This is a point that comes home to them at once. Every English lad wishes to be strong, and if it can only be impressed upon him that smoking will make him a stunted weakling, he will be more likely to steer clear of the habit than if high moral considerations were brought forward.

EUCALYPTUS AS A CURE FOR RHEUMATISM.—*Russian River Flag*: Anson Goodspeed, of this city, was some time since afflicted with inflammatory rheumatism. One ankle and foot swelled to nearly twice their natural size, were exceedingly inflamed and very painful, and he could not use the other limb at all. Mrs. Goodspeed procured some eucalyptus leaves, rubbed them together a little, and without further preparation bound them on in good quantity, renewing every hour and a half or two hours, as the fever rendered them dry. In 12 hours he was much easier and in 24 hours the limb could be used. This was the speediest relief Mr. Goodspeed had experienced in the many times that he had been afflicted with the same disease. A physician from San Francisco at this time informed Mr. Goodspeed, that, knowing the excellent medicinal qualities of these leaves, he had already prepared at least half a ton for shipment to the East for medicinal purposes.

Conditions of Health in Rural Homes

In a recent lecture, Prof. Kedzie said: Much depends upon the site for a house. Choose for the site some gentle swell of ground, not a hill, which you must wearily climb. Let the ground flow off with a gentle declination to the south or southeast; avoid swamps and low land. The soil should be free from stagnant water with a dry sub-soil, and the soil must be free from such water to a depth of at least six feet. The house should face the south or southeast. The living rooms should be on the eastern side of the house, because this receives the first sunlight in the morning and is in the shade in the afternoon. In summer the mornings are often chilly and the afternoons very hot. The usual materials for building in New York were wood and brick. He thought a brick house afforded better conditions of health because its walls are more permeable by air. By suitable arrangements you can blow through a solid, dry brick, but wet a brick, and the passage is arrested. Brick absorbs moisture and expels air, and such brick, when dry, contains about three-fourths of a pint of air; if a dry brick can hold so much air, it can permit air to slowly breathe through it. Wall paper is not conducive to health, because it is impervious to air. Wood is permeable by air in the direction of the grain, and some kinds of wood very readily permit the passage of air from end to end, but the air does not readily pass through laterally. He advised all to make walls secure against rats and mice, and this might be accomplished by bringing forward one course of brick so as to touch the baseboard all round: the rodents could not then get through. If wood is used let in a piece of scantling between the studs all around at the top and bottom, and lay a tight course of brick and mortar on the top of these pieces of scantling. He advised not to build any half stories, and, if it was possible, to have a good fireplace in the living-room, and use it. No inanimate thing in the house is so cheerful as an open fire. Ventilate your houses, first, because there is plenty of raw material for this purpose; and second, because it is necessary for health. Air once breathed is unfit to breathe again, and should be turned out of the house. Nature has given every one a nose by which to detect impure air. Every house should have some plan of ventilation, however poor. Cellars also should be ventilated. Here lies in ambush diphtheria and membranous croup, the disasters of childhood, and typhoid fever, that strikes at all ages. Do not expect to preserve health over such a charnel house. Let in the sunlight. No plant so much as man demands light and air. A good supply of pure water is a fountain of life in any household. To test water fill a perfectly clean quart bottle two-thirds full of water, dissolve in this a teaspoonful of clean white sugar, cork the bottle, and put it away in some warm place for two days, and if it remains clear and bright you need fear no evil from its use; but if it turns milky white and gives off an offensive smell, beware how you use it. Do not throw out of doors or windows slops to fester and rot, filling the house with flies and foul vapors.

PREVENTABLE DISEASES.—In the report of the San Francisco Board of Health, made last week, occurs the following paragraph: More than one-fourth of the deaths are due to diseases that would hardly exist under proper sanitary surroundings. Diphtheria and typhus fever are closely connected with bad drainage, while measles, scarlet fever, cholera infantum, dysentery and other diseases would be of far less frequent occurrence with a proper system of drainage. Last summer, attention was called to a neighborhood in the northern part of the city, which seemed to have more than its share of illness. There was diphtheria and typhoid fever, although the locality was situated on high ground, from which the descent was steep and in which a new sewer had been recently laid. But a property owner had put in a small wooden drain leading from his house to the cesspool at the corner of the street. It was placed just below the surface of the ground and was not provided with a proper outlet. The consequence was that the soil became more or less saturated with matter from this drain and sickness ensued. One property owner, whose family was nearly prostrated by a low form of typhoid fever, had called again and again upon the Superintendent of Streets to give some relief, but the little drain was not thought to be the cause of the trouble and was left undisturbed. The result was that the family determined to sell their house at a sacrifice and move away. The whole neighborhood felt the depressing effects of the vitiated air and diphtheria entered into many families in the vicinity. The effect of bad drainage is seen not only in the diseases that are due directly to it, but in the lowering of the tone of health and the marked predisposition to general diseases. Its effects are widespread, and yet the great number of deaths from diseases of a zymotic character could be easily reduced by simple attention to sanitary laws and especially to drainage.

CONTAMINATION OF AIR BY CESSPOOLS.—The *Chemical News* contains a statement of Dr. F. Frismann that 18 cubic meters of excrement, as found in cesspools, will give off per day 18.79 cubic meters of irrespirable gases, proportioned as follows, viz.: Carbonic acid, 11.144 kilos; ammonia, 2.040 kilos; sulphuretted hydrogen, 0.033 kilos; carburetted hydrogen, 7.464 kilos. He considers copperas and sulphuric acid as among the best disinfectants for cesspools.

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SAN FRANCISCO:

Saturday Morning, Feb. 16, 1878.

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The Week.

Still the rain storms continue, and the farmers are commencing to cry out, "Hold, enough!" but the miners in the upper counties are rejoicing and using every drop of water that runs. In some places snow has banked up the ditches and caused some inconvenience, but as a general thing, now that the ground is well soaked, the reservoirs are filling, the ditches and flumes running full, and the hydraulic miners are hard at work. There is danger of some damage by flood along the Sacramento river, and the city of Sacramento, the lower part partially flooded, will be in a bad fix in case the American river rises much. Below the city a large tract of country is under water, and a great deal of the reclaimed tule land lower down has been flooded by seepage or breaking of levees. On Tuesday night and Wednesday morning we were visited with the most severe southwest wind we have had here for years, and although little damage was done in the harbor, we will probably hear shortly of disasters on the coast. All the vessels which have arrived lately have been severely handled, and some have been as long as 42 days coming from Puget Sound. Several have not been heard from for a month. So far, this winter has been the stormiest for many years, although the earlier part was quite mild. We need never fear a dry winter again until January has passed without rain. About 22 inches have fallen at this point so far, and it does not look now as if it would stop raining for some time to come.

Our Useful Metals and Minerals.

Besides gold and silver producing mines, we have on this coast, the useful metals and minerals in great variety and large supply. Concerning these not much is said, because, with the exception of four or five, very little has as yet been done towards rendering them practically available. Our coal, copper, quicksilver, lead, salt and borax have been somewhat extensively utilized, and efforts are about being made to test on a larger scale than heretofore, the commercial value of our sulphur and petroleum deposits. Iron, antimony, manganese, chrome, graphite, gypsum, the natural pigments, the useful clays and earths, slates and marbles we have in great abundance. Mica and asbestos have been found on the coast, also a little tin with some fine and a few precious stones.

Copper.

Of this mineral our heaviest deposits have been found at Mount Diablo, Contra Costa county; about Coos Bay, in Oregon; near the shores of Puget sound; in Utah and Wyoming Territories. Lignite, forming a very good fuel for domestic purposes, and for the generating of steam, has been found at a great many places in California, as well also as in nearly all the other Pacific States and Territories. The receipts of coal from domestic sources at the port of San Francisco during the year 1877, amounted to 346,341 tons, of which there were received from the Mount Diablo mines, 96,172 tons; from Coos Bay, 30,941; from Bellingham bay, 10,475; from Vancouver island, 102,421; from Seattle, 102,333; from the Rocky mountain mines, 133; from Ione, Amador county, 3,458; from Oxnard, 190; from Buckeye, 41; and from Carbondale, 177 tons. Besides these we received from Chile 8,145 tons; from Australia, 100,513; from England, 89,362, and from Pennsylvania, 32,399 tons, the total receipts for the year from all quarters having aggregated 531,000 tons. The value of the coal extracted from the mines on this coast amounted to fully \$2,500,000, a sum that must rapidly increase with the enlarged product from this source hereafter.

Copper.

Cupiferous ores are widely diffused over the Pacific coast. Owing, however, to the low prices of copper, not much has been done of late towards working this class of deposits. Some five or six hundred tons of ore have lately been shipped from the Eagle mine, Quail hill, Calaveras county, where the developments are said to be very promising. The English company operating at Battle Mountain, Nevada, have done comparatively little during the year, though they might easily take out a large quantity of ore, and would, no doubt, do so under a more lively demand for this metal. The value of the copper ore shipped, hence, does not amount probably to more than two or three hundred dollars for the entire year. A very valuable find of this ore is reported to have been made within the past few months at a point near the Eagle mine, this ore carrying, according to numerous assays made in this city, from 20 to 50 per cent. of copper, and from \$100 to \$150 in silver to the ton. With only a slight improvement in the market, this industry would at once spring into life again throughout nearly all our Pacific States and Territories.

Quicksilver.

Scarcely any one of our mining interests has suffered more of late from depressed prices than this, which, from a very flourishing condition two years ago, has fallen into an almost profitless estate; and this not because there has been any abatement in the demand, but simply in consequence of a slight over-production on this coast. If, when the market began to decline, our mine owners could have managed, through concerted action, to restrict their annual production to the extent of eight or ten thousand flasks, prices might have been maintained, if not at the very highest figure, certainly at rates that would have proved fairly remunerative.

The California product of this metal last year amounted to 78,600 flasks, against 75,074 the year before, and this, notwithstanding some of the larger companies curtailed operations considerably, while many of the smaller ones ceased altogether. Some of the larger companies are now moving with a view to forming such a combination as will insure an advance of prices through a lessened production. Whether such an arrangement is feasible with many is a question, but certain it is prices cannot appreciate if a few of the leading companies continue to turn out this metal at the rate they have been doing of late, the New Almaden having made last year over 24,000 flasks, while the Sulphur Banks made nearly 12,000 and the Redington nearly 10,000 flasks. Without some concerted measures being taken to check production, the yield of quicksilver for the present year promises to be even larger than last. Of the quantity made in 1877, 46,280 flasks, valued at \$1,635,310, were exported to foreign countries, 31,210 flasks having been sent to China. Total value about \$3,000,000. Retail price of this metal varies at present from 43 cents to 45 cents per pound.

Lead.

The extreme low prices ruling for this metal has tended to restrict its production in the far west, more especially in Utah and Colorado, where much dependence is placed upon it as an auxiliary in helping to defray the expenses of reducing the argentiferous galena and other lead-silver bearing ores. Many furnaces re-

mained idle in these Territories last year, because of the low price of lead, and without some improvement in the market they will be likely to continue so the present year. The wholesale price of lead in this market at the present time is 5@5½ cents for pig; 6½ for bar, and 9 for sheet. The entire production of lead in the U. S. last year is estimated at about 70,000 tons, being fully 10,000 tons in excess of the yield for the preceding year. Of the above quantity five-sixths were made in Colorado, Utah Nevada and other Pacific States and Territories. The Selby Smelting Works, in this city, turned out in 1877, about 6,000 tons of pig lead, of this, 500 tons were shipped to China, and 3,000 to New York, the rest being consumed here. The Richmond Consolidated mines at Eureka, Nev., turned out last year something over 5,000 tons of pig lead, the most of which was shipped to New York. The Eureka Consolidated mine at the same place produced a still larger quantity, the most of which was consigned to the same market in the shape of crude bullion, the Richmond company separating the lead from the silver at their mine. It is expected that a much larger proportion of the lead from these mines will this year find its way to San Francisco, than has heretofore been the case. It is also probable that our receipts of this metal from Arizona and the mines of Inyo county, California, will be larger the present year than they were last.

Borax.

The prices of this commodity, like those of lead, have been much depressed the past year, causing all the companies, except those enjoying especial advantages for production, to retire from the field. These low prices have tended, however, to stimulate consumption and even created new uses for this valuable salt, compensating to some extent for the prevailing low prices. The total amount of borax made on this coast last year reached 4,254,209 pounds, being over 1,000,000 pounds less than was produced the year before. Of the above quantity, Smith Bros., at Teal's Marsh, Nevada, and the Riddell Company in the State range, San Bernardino county, Cal., produced each about 2,000,000 pounds, the balance being mostly made by Dodge & Co. at the latter locality. The Riddell Company, which possesses great natural facilities for making this salt, have lately added largely to their extensive works at their marsh, where they now refine their entire product, making an article not inferior to any coming on the market. The efforts made to manufacture boracic acid in this city, from the borate of lime brought here from the Nevada marshes, having been found unprofitable, has been discontinued. As the deposits of the crude material are not likely to prove as extensive as was at first supposed, the manufacture of borax on this coast will probably continue to diminish hereafter causing a corresponding advance in price. At the rate the several companies have been manufacturing for several years past, these deposits are being rapidly depleted, and only in a few localities do they tend to reproduce themselves to any great extent.

Sulphur.

From the sulphur deposits in Humboldt county, Nevada, there were extracted last year about 1,000 tons of refined sulphur, which found a market in this city. As the companies owning these deposits have greatly enlarged and improved their reduction works and otherwise increased their facilities for turning out this mineral, it is expected that the above quantity will in the course of a few months be doubled, and that they will very soon be able to supply the entire demand of this market, which calls for about 3,000 tons yearly. The Humboldt is fully equal to the best imported article, being in fact, as it comes from the companies works, chemically pure.

Petroleum.

In several of the southerly counties of this State favorable indications of the presence of deposits of the earth oils are met with. Lately borings at numerous points have been undertaken, some of which have already resulted in obtaining a good flow of oil, while others promise at least a moderate success. Among the exploiters of these deposits the Star company operating in Los Angeles county would up to this time seem to have met with the greatest encouragement, having developed five producing wells, two of which are flowing. They have erected refineries and are turning out an excellent quality of illuminating and lubricating oil, and claim that they will be able in a short time to supply the local trade in those articles. Of the 13,500,000 barrels of crude oil produced in the United States last year, California is credited with 73,000 barrels.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Northern Belle, Feb. 4th, \$2,220.41; Emigrant M. Co., total for January, \$6,150; Sheldon, total for January, \$1,000; Manhattan, 6th, \$7,939.88; Tybo Con., 4th, \$9,132.40; Northern Belle, 6th, \$3,019.20; Standard, 6th, \$18,163.39; Con. Virginia, 7th, \$188,694.66; Alps, 11th, \$1,967; Endowment, 11th, \$2,300; Eagle, 10th, \$1,700; Grand Prize, 11th, \$22,600; Arizona, \$1,743.36; Tybo Con., 8th, \$10,023.70; Alps, 12th, \$1,998; Northern Belle, 9th, \$3,016.43.

The first entertainment of the Washington Camp, No. 1, Patriotic Order Sons of America, will take place Thursday evening, 909½ Market street, on February 21st. We acknowledge receipt of an invitation.

Foundry Notes.

The Fulton Iron Works.

The Fulton Iron Works, Fremont street, is now one of the four large foundries of this city, having facilities for doing any kind of work in their line without depending on other shops. A change in the firm was made a few months since, by which the old Fulton works and McAfee & Spiers Boiler Works became one institution, the new firm being Hinckley, Spiers & Hayes. Before that time the Fulton works made no boilers, but this department is now added, so that the works are now capable of doing machine, foundry, blacksmith and boiler work, and in fact anything in this line. The boiler making department fronts on Howard street, comprising the old shops of McAfee & Spiers, and the foundry and machine department fronts on Fremont as before. The buildings are all connected and the fronts have been repainted, new machinery has been added of the latest patterns, and heavier than that previously used, so that now the Fulton is one of our first-class foundries. Mr. Hayes, who has long been identified with the Fulton, is now one of the partners, and Mr. Spiers, of the old firm of McAfee & Spiers has charge of the boiler department. He has made this a special study for many years, and devotes his whole time to it. Mr. Hinckley is well-known as one of the proprietors of the Fulton works for a number of years. They have at work now about 150 men, and in busier times employ over 200, as occasion demands.

The largest work in the shop at present is the boilers, machinery, etc., for the Newton hydraulic dredge. The machinery consists of two vacuum cylinders placed on the front end of a scow, each having a capacity of about 100 cubic feet. They are connected by a cross-pipe, from which depends the suction-pipe, which is capable of being lengthened or shortened, according to depth of water. The large air chamber over the suction-pipe is 10 feet high and 40 inches in diameter. The suction-pipe is 24 inches in diameter and is made telescopic, so as to admit of being lengthened or shortened at will. Steam is forced into the vacuum cylinders (of a capacity of about 100 feet each) from the exhaust of the Blake pump, under a pressure of about seven and a half pounds, or it may be taken from the boilers under a pressure of 100 pounds, according to the work to be performed. The machine may be described as a gigantic pump, and the steam acts as a piston one way, driving the air out, and by its sudden condensation the vacuum is formed. Everything with which the suction-pipe is in contact is then elevated, this action being assisted by jets of water forced against the material from above by means of a Blake pump. These jets act like streams against a bank in hydraulic mining, except that they are under water. A cubic foot of granite weighs about 160 pounds, and to this is applied a lifting power of about 1,050 pounds, an example showing what the machine is expected to accomplish. One of these, recently built, will be in operation in a few days to work submerged placers on Dry creek, Colorado; another is being built to go to Brazil for the same purpose. They are just commencing to build one here, also, for mining on the Feather river. Mr. G. W. Cummings, Superintendent of the Newton hydraulic dredging and mining company, is the one who brought this dredge to the attention of the public on this coast.

The scow on which the machinery described is to be placed, was built at Oakland by Simpson Bros. No less than 82,000 feet of lumber have been used on the hull alone. The Blake pump was furnished by H. P. Gregory & Co., agents in this city, who had it made to order at the factory. This is a duplex Blake pump, and weighs 11 tons, the largest one of the kind ever brought to this coast. It came, all set up, on a car from the East. The steam cylinder is 24 inches in diameter, valve cylinder 12 inches, and stroke 24 inches. The capacity is 100,000 gallons per hour at ordinary speed. It is intended to project the water from the nozzles at a speed of about 250 feet per second.

Among other things they are now building at their works a new boiler for the old steamer *Wilson G. Hunt*. She is now being overhauled and put in thorough order, and will be sent up the coast. The new boiler is 8½ feet in diameter, and 22 feet long, containing two furnaces 45 inches wide, and 8 feet 6 inches long, having direct flues and return tubes. The steam chimney is 5½ feet in diameter, and 12 feet high. The boiler is built out of Tennessee iron of an inch thick, and 55,000 tensile strain.

They have just put three new boilers into the steamer *Princess*, which is to be used as a sort of floating elevator. She is to be fitted with machinery for elevating grain in sacks from barges into a vessel, and handling sacks of grain. A boiler 42x26 is also being built for Vance's sawmill, at Eureka, to replace one which burst. Also a boiler 50x16, and coils for a cannery, to be built on this bay. Two large upright hoisting boilers are under construction, and a lot of fish tanks for the Columbia river. Since the new firm commenced business, in October, 39 boilers have been made at their works.

A five-stamp mill is being built for a quicksilver mine at Santa Barbara, a five-stamp mill for the Extra mining company, Shasta county, and an engine and boiler and cast-iron columns for the South Park malt house. Considerable jobbing work is also being done. They are also making some of the work for the running gear of the dummies to be used on the California street railroad.

Our Visit to the Redding Ranch.

We made a brief allusion, last week, to a trip to the Redding ranch, in Shasta county, with the promise of more full mention this week. The time chosen for the trip was probably the most unfavorable one which could have been selected for many years past. We reached there just as railroad communication with the ranch had been cut off by the washing away of the railroad bridge at Cottonwood creek, which empties into the Sacramento just below. By a temporary portage across the creek, and a hand-car upon the other side, we reached Cottonwood station, from whence we were taken in a carriage by Mr. Edward Frisbie, the present proprietor of the ranch, as far as the town of Anderson—a railroad station which has been laid out upon the ranch, and which is rapidly growing up into a point of considerable importance.

The next day after our arrival, the severe storm of Sunday, February 27th set in, by which the Sacramento river and Cottonwood creek were both so swollen that all transit across either was suspended, and no railroad trains could pass northward beyond Red Bluffs. Of course many of the roads about the ranch were nearly impassable, while many of the large sloughs and creeks were quite so. But notwithstanding these difficulties, Mr. Frisbie drove up to the hotel at Anderson bright and early on Monday morning, with a team mud and water proof, and invited us to take

A Look Over the Ranch.

Notwithstanding the disagreeable character of the day and of the roads, we promptly accepted the offer. During the ride we passed over quite an extensive stretch of fine bottom land to the east and south of Anderson, after leaving which we rode along the table or bench lands and parallel to it, and thus continued northwardly until we reached Clear creek, the waters of which were anything but clear. Much of the bottom land was in wheat, which was looking well, but the larger portion was still covered with oaks and scattering undergrowth, and had probably never been put to any other use than pasture. Clear creek, or rather the deep slough running parallel to it, was so swollen by the late rains that we found it impossible to reach the toll bridge; so leaving our carriage, we crossed over on the railroad bridge near by, and made a call upon Mr. J. J. Bell, who keeps the toll bridge at this point, and who owns what has for many years been known as

Bell's Ranch.

We were received with much cordiality by Mr. Bell, who kindly invited us to spend the night and next day with him. Having decided to accept his kindly invitation, we bade good day to Mr. Frisbie, who promised to call for us the next afternoon. Mr. Bell is well-known to all teamsters and travelers who, in ante-railroad days, were accustomed to pass by this route to Oregon and to the "Redding mines," which are located on and near this ranch. He arrived here in May, 1851, purchased 1,300 acres of land of Mr. Redding, settled down to ranching, built a bridge to accommodate the travel in winter, and a large hotel for the convenience of travelers. He is chiefly engaged in stock-raising, and just at this time is paying considerable attention to the breeding of the Angora from the common California goat. He has now two herds, one consisting of 270 and another of about 730.

After discussing a good dinner, Mr. Bell took us over a portion of his ranch, and gave us a little insight into a somewhat extensive mining enterprise which he has in view upon this ranch, and which we shall allude to more fully when we come to speak of the mining interests of this locality. The next morning, Tuesday the 29th ultimo, the rain still continued, but our host brought out a covered buggy, with which the distance to the town of Reading, about eight miles, was soon measured.

The Town of Reading

Is well and pleasantly situated near the west bank of the Sacramento, where that king river of California leaps out of the Sierra Nevada range, and passes along the first bottom land to the plains of the great valley below. The California and Oregon R.R., the great northern railway of the State, passing on its way to the big north State, makes Reading its present terminus.

Here passengers and goods for the large mining and agricultural districts of northern California and southern Oregon diverge from railway transportation. Considering the general routes of travel, it is centrally located in the county, and may some day be fully entitled to the county seat.

The R. R. Co. have a large depot, with commodious side-tracks. There are several well kept hotels, one near the depot being quite large. The town has a good business appearance, with large and well-stocked stores. Mr. Frank, publisher of the *Reading Independent*, prints a good local paper, on bright type, in an entirely new and well adapted building. It is actually the cleanest printing office in America. (Mrs. Frank is a practical printer, which explains this strange feature in a printing office.) Judge Bush, a leading citizen, showed us the town "in brief," stating some forcible arguments in favor of its future rapid growth.

The Return.

Prompt to his word, Mr. Frisbie met us in the afternoon and took us on our return as far as Anderson, where we spent the night, and the next morning, after an early breakfast, our kind friend once more appeared with his carriage and conveyed us to Cottonwood creek, where we found the railroad bridge still unrepaired, and no trains in prospect for some days to come; and as no teams could cross or ford the creek, our only alternative was to cross in a small boat, which had been hastily constructed, and launched while we were there. We were assured that by following along the track for some nine miles, to the "Summit," we should probably find a locomotive and tender upon which we could get a passage the balance of the way to Red Bluffs. So starting out, some

obstructed by the locomotive with which we had failed to connect. Our regret at missing the locomotive was now turned to gladness, from the fact both it and its tender had fallen through a bridge some 20 feet high, the supports of which had been washed away during the day. With considerable efforts, and by the aid of a lantern we were enabled to cross the chasm upon broken timbers, when we once more took up our "tramp" along the road two miles further to the Bluffs, where we arrived weary and hungry, just in time to escape a furious rain storm which set in about 9 o'clock, and continued through the night. We took the next regular train at 4 o'clock A. M., and in due time arrived in San Francisco, fully satisfied with a little rough experience of railroad traveling in a California wet winter.

No one who has not been an eye-witness can form any idea of the labor and expense which has been involved during the past few weeks in the efforts of the railroad company to keep communication open between Red Bluffs and Reading. Everything that human appliances could do has been brought into requisition for this purpose, and we learn by letters received at this office that the first regular train since the break passed up from Red Bluffs on the 7th instant. The experience of this season—the first severe one since the road was built—has shown just what is needed, and the company will, no doubt, so construct their road and bridges that there will be no such interruptions of travel there in future as we have here chronicled. Mainly the road appears well constructed, and the track thoroughly ballasted with good gravel.

Of the fine land we viewed we shall report hereafter.

Legislative Topics.

Among the important topics presented to the Legislature during the week have been proposals from two respected citizens of the State, to give of their wealth to widen the scope of the State University and increase its facilities for imparting instruction. One is the proposal of H. D. Bacon, to give \$25,000 in cash and a library and art collection valued at \$75,000, toward the construction and equipment of a library and art gallery building, providing the State will give \$25,000 to complete the needed fund. A bill has already been introduced making the requisite appropriation of \$25,000 on the part of the State, and it is believed that the bill will prevail. It is certainly a very favorable opportunity for the State to secure these valuable adjuncts to its educational equipment at Berkeley, and the liberality of a citizen should not fail of State recognition. Another proposal of similar nature is that of Hon. S. C. Hastings, of this city, to give \$100,000 as a fund, the interest of which is to be expended in maintaining a law school or college of law as one of the branches of the University. This will place the acquisition of a legal education within easy reach of the young men of the State, and will do away with the need of the expensive undertaking of attending the Eastern law schools. All that Mr. Hastings asks is that the State act as trustee of the fund and see that the interest is rightly applied to the desired end. We are glad to see these evidences of interest and liberal donation to the work of the University by rich and public spirited citizens. If such can be assured that the University will be held to its true onward

course by the State and not be allowed to be tossed hither and thither upon the waves of politics and restless theory, there will cluster about it a wealth of endowments which will advance all departments of its work with but little draft upon the public treasury.

Assemblyman Waters, of San Bernardino, has introduced a bill amending the Penal Code by adding a new section concerning the sale of artificial or spurious honey. Every person who either sells, or exposes or offers for sale, any artificial or spurious honey, as, and for genuine or pure honey, is guilty of a misdemeanor.

Senator Smith, of Los Angeles, has introduced a concurrent resolution protesting against the substitution by Congress of an *ad valorem* duty on imported wines, in place of the *specific* duty of 40 cents a gallon which now exists. Senator Smith rightly reasons that the substitute of a duty according to the value, will flood our country with low-priced and notoriously adulterated foreign wines, and ruin the manufacture of wine from pure juice which is now becoming a great industry in our State and of the country in general. We trust our legislature will give its voice against the removal of the present tariff.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

ARIZONA MINERAL AND LAND Co.—Feb. 9th. Location, Pacific States and Territories. Capital stock, \$100,000. Directors—Wm. T. Alwood, C. M. Seeley, Benjamin Lake, Walter Townsend and T. L. Bibbins.

TOLETO M. Co.—Feb. 9th. Location, Toletogulch, Mariposa Co. Capital stock, \$1,000,000. Directors—Bernard Lande, Edward Meyers, H. H. McClellan, H. H. Hobbs and Grove Adams.

ELLEN GOWAN M. Co.—Feb. 11th. Capital stock, \$10,000,000. Directors—John M. Miner, E. S. Denison, Wm. P. Miller, C. W. Crocker and H. H. Pearson.

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THE WHITE FURNACE.—In our advertising columns will be found a card of the Pacific Iron Works, of this city, in relation to the so-called "White patent inclined cylinder roasting and chloridizing furnace," which is now rapidly growing in popular favor, and is fast superseding others. The information given in the card referred to will be of interest and value to our mining friends.



THE DEFIANCE MILL OF SIERRA FLUME AND LUMBER COMPANY.

four miles brought us a point where the road bed and track had been completely washed away for several hundred feet, and a repair train partially wrecked. Picking our way around the wreck, we arrived at the "Summit" only to find that the locomotive and tender, which had come up to that point, had returned, and there was nothing left for us but to continue our weary "tramp" nine miles further.

Curious Railroad Obstruction.

We have frequently read of railroads being washed away, and sinking out of sight in water or mud, but here we saw the mud actually rising up from below, pushing the track up until by its tension it could rise no further, when the mud commenced to overflow, and finally covered the rails and ties completely out of sight. There is here a deep cut through a gravelly hill, the earth of which is of such a yielding nature, that when so completely saturated as it has become by the late rains, the weight of the earth on either side of the cut is sufficient to press the loose material of which the hill is composed upwards along the cut. The rails and road bed had been raised several feet in the center of the cut, while the soft mud was so forced up by the sides of the road as to run over and completely cover the track to a depth of several inches. Large quantities of this mud had been taken out of the cut and dumped off the embankment beyond; but as it still continued to rise, work has been suspended until the water shall drain out and the earth once more become solid.

More "Roughing It."

We continued our "tramp" from this point until darkness was beginning to close in without finding even a convenient barn or sheep camp in which to take shelter for the night, and from a threatening rain storm which was evidently about to overtake us, when we were happily overtaken by Mr. T. J. Davis, the head carpenter of the road, on a small flat car by which we were taken a distance of some three miles, where the further progress of the car was

We tender our thanks to the many friends from whom we received kindly attentions during the above trip, and hope at an early day to embrace an opportunity to revisit this interesting portion of the State under more favorable circumstances.

The Sierra Flume and Lumber Company.

In previous numbers we have given certain details concerning the extensive business of the Sierra Flume and Lumber Company, and also engravings of some of their mills. The company own property worth nearly \$2,000,000, including ten saw mills, three planing mills, and one sash and door factory. They have upwards of 150 miles of V-flume, 11 miles of tramway for logs, and 157 miles of telegraph lines to the mills and factories. The mills have an annual capacity of 50,000 000 feet of lumber.

The lumber is brought to the various mills from the mountains in V-flumes, these furnishing a more rapid and economical means of transportation than any other. The flumes are constructed at considerable expense and trouble, but answer the purpose most admirably. The water is collected from all available streams and springs and brought by feeders to the main flume. It takes a large amount of water to supply the various flumes belonging to the company, and many serious engineering difficulties have to be overcome in their construction. Some of the mills are run by water, some by steam, and some by both water and steam.

The Defiance mill, an engraving of which is shown on this page, is a mill on the Moscow division. It lies in a valley in the mountains with heavy timber all about it. The mill is run by steam, and the lumber sawed by it is delivered by flume at Red Bluffs.

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	Jan. 24.	Jan. 31.	Jan. 24.	Jan. 31.	Feb. 7.	Feb. 14.	Feb. 7.	Feb. 14.
Alpha.	11	11	11	11	11	10	10	10
Alta.	94	7	94	81	91	71	83	84
Andes.	1	60c	85c	75c	80c	75c	75c	65c
Alps.	54	51	6	5	52	5	5	45c
Argentina.	1.40	11	1.35	1.20	1.20	1.10	1.05	65c
Belmont.	6	54	52	5	51	41	48	40
Best & Belcher.	19	171	183	18	191	171	181	17
Birmingham.	4	60	5	2	4	50	5	5
Bechtel.	10		9		9	8	9	
Bodie.	12	13	11	1.10	14	1	1	70c
Benton.	14	.90c	11	1.20	1.40	1.20	1.30	2.15
Caledonia.	3	274	261	24	263	283	27	281
California.	2	261	2	263	283	27	281	27
Challenge.								75c
Chollar-Potosi.	333	30	322	31	34	30	322	31
Confidence.	54	5	50c		54	43	43	50c
Cop. Imperial.	22	213	223	223	23	23	23	21
Crown Point.	54	51	5	51	5	5	4	4.10
Dayton.	40c	30c	30c		25c		25c	30c
DeFrees.	60c	55c	55c	45c	50c	1	50c	15c
Day.	2	1			1	50c	1	46c
Eureka Con.	38c	351	38	36	39	371	361	39
Exchequer.	3.95	31	3.40	2.85	3	2.4	2.55	10c
Endowment.	1.30	1	80c	70c	1.0	80c	90c	10c
East Nevada.	10	91	10	81	11	81	10	10
Grand Prize.	13c	12	13c	12	13c	13	13c	12c
Gila.	75c	61c	70c	65c	65c	60c	60c	
Golden Chariot.	1.10	80c	1.10	1	85c		1	95c
Gould & Curry.	12	91	9	91	81	81	10	10
Hale & Nor.	10	10	10	81	11	10	10	10
Hussey.	40c	30c	75c	40c	85c	70c	90c	50c
Julia.	1.60	1.30	1.45	1.2	30	1.4	2.40	2
Justice.	101	94	11	94	11	101	11	101
Jackson.	45c	41	3	3	3.05	3	2	2
Joe S. Adams.	45c	25c	40c	30c	30c		50c	30c
K & K.	3							
Kentuck.	44	4	44	4	44	4	4	3
Kosuth.	20c	15c	20c	15c	15c		10c	
Leah.	10	9	9	9	9	9	9	9
Leopard.	1	9	9	75c	65c	50c	55c	30c
Leviathan.	20c	15c	20c		20c		20c	15c
Leeds.	21	2	2.40	2.20	21	2.05	2.20	2
Modoc.	50c	50c	40c		10c	91	10	9
North California.	104	10	104	101	101	91	10	9
Meadow Valley.	30c	20c	30c	25c	25c	20c	25c	15c
Mexican.	14	13	14	13	14	12	13	13
North Con Virginia.	75c	50c	75c	50c	70c	60c	70c	40c
Old S. Adams.	2	2	2	1.90	1.90	1.65	1.90	1.3
Northern Bell.	11	104	11	104	104	101	11	101
New Coso.	50c		50c		1	30c	1.60	1
Nevado.	95c	65c	80c	70c	1.5	60c	1.55	1.1
Occidental.	1.10	83	1.1	75	55	45	53	50c
Old S. Adams.	191	171	171	173	151	151	15	14
Panther.			45c	40c			40c	
Raymond & Ely.	91	8	7	6	43	4	54	4.90
Red Island.	10c	10c	20c	10c	10c	10c	10c	10c
Sage.	113	101						

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING JANUARY 29TH.

CARPET SWEEPERS.—B. Figer, S. F. **UMBRELLA RUNNERS.**—A. Good, S. F. **WELL-BORING MACHINES.**—J. Haas and J. Manning, Stockton, Cal. **DEVICES FOR OPERATING WINDOWS AND FRAMES.**—J. Kelly, S. F. **COMPOUNDS FOR PRODUCING ILLUMINATING GAS.**—L. Marks, S. F. **DERRICKS.**—T. Powell, Stockton, Cal. **NETTING FOR UNLOADING WAGONS.**—T. Powell, Stockton, Cal. **CHECK VALVES FOR BID COCKS AND FAUCETS.**—O. Chiller, Sacramento, Cal. **OSCILLATING PUMPS.**—P. A. Clark, Anaheim, Cal. **NUT LOCKS.**—L. Landeker and H. S. Laird, San Luis Obispo, Cal. **SPRING BED AND FIRE-ESCAPES.**—J. G. Rahner, Portland, Oregon. **THE MANUFACTURE OF DOORS, ETC.**—J. Springer, S. F. **SCRUBBING MACHINES.**—A. F. Stockley, Bishop Creek, Cal. **HAY CUTTERS.**—J. Weichart, S. F.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

NETTING FOR UNLOADING WAGONS.—Thomas Powell, Stockton. This device is an improved arrangement for connecting and disconnecting the two halves of the false bottom or netting which is placed in the bottom of a header wagon before it is loaded, so that the load can be belted holly and dumped at one operation. Each half of the net is triangular in form, so when connected the false bottom is diamond-shaped. Two corners only have then to be gathered together above the load. The frame is composed of hinged bars which can be closed together, so as to retain the load, but which will open out when the latch is detached, so as to form an opening through which the load can pass. When the frame is opened, the load drops readily through the opening, without the entire separation of the parts of the netting, so that the parts can be easily connected after the load has been dropped. This arrangement prevents the possibility of injury to bystanders, as often happens with the ordinary net, when the lower ends of the parts fly outward by the dropping of the load.

NUT LOCK.—Lazare Landeker, Laird Landeker and Hilamon Spencer, San Luis Obispo. The object of the invention is to provide a cheap, simple and effective device for securing nuts to bolts, which are liable to become loose by constant jarring or other causes. It consists of a metallic washer, having projecting flanges on its upper side, which prevent the nut from turning on the washer, and having one or more pawls, or catches, which engage with radial slots or grooves in a second washer, placed below the first, or in the surface, which the first or upper washer is in contact with, so that, as the nut is turned on the bolt, the first washer turns with it and engages with the slots or grooves, so as to prevent the bolt from turning back, but permitting it to be turned forward or tightened whenever it becomes loose. In case a second washer is used, it is provided with flanges, which enter the hole and thus prevent it from turning on the bolt.

SCRUBBING AND MOPPING MACHINE.—F. Stockley, Bishop Creek, Inyo county. The machine for scrubbing and mopping floors consists of a tank mounted upon a wheel at one end and a scrubbing brush at the other end. The tank serves for containing and heating the water to be used in cleaning the floor. The inventor also provides a lamp-chamber below the tank, in which a lamp is carried for heating the water, a sprinkler for spraying the water upon the floor and brush and mop for drying the floor after the brush has passed over it. The whole is combined in one machine and operated automatically from the hearing-wheel, which supports the tank.

PUMP.—P. A. Clark, Anaheim, Los Angeles county. The inventor calls this an improved quadruple suction and force pump. The invention consists of a rocking or oscillating piston, moving upon a longitudinal axis in a cylinder which has a diaphragm longitudinally through its center. This diaphragm is so made as to re-

ceive two sets of suction valves and two sets of discharge valves, which are respectively connected by proper passages with the inlet and outlet pipes. The operation of each valve is to close first the lower and then the upper part, so that there are four openings for ingress and four for the discharge of water at each complete or double movement of the piston, each valve doing double duty. As the piston and the diaphragm form four distinct chambers of the cylinder, it will be seen that the two diagonally opposite will be taking in water while the other two are discharging it.

CARPET SWEEPER.—B. Figer, S. F. This patent covers certain improvements in that class of carpet sweepers in which a revolving brush is mounted inside of a case so as to sweep the floor when the case is moved over it. The improvement consists of a novel device for securing the brush in the box or case by which it can be readily detached, so as to be taken out for the purpose of cleaning the brush or sweeper. The device for securing the brush in the case is so arranged that the brush can also be adjusted to or from the floor, so that as the bristles of the brush wear away, the brush can be adjusted so as to preserve the same relative position with reference to the floor. The invention further consists of a novel application of the India rubber band which is used for protecting the furniture from being marred when sweeping, and in a lid for opening and removing the dust in the box without removing the brush.

DERRICK.—Thomas Powell, Stockton. The invention relates more particularly to such derricks as are used for lifting loads of grain from header wagons and for other hoisting purposes. The improvement consists in so applying the ropes which sustain the boom and hoists the load, that they will form a truss to stiffen and strengthen the mast, so that the heavier the load the more perfectly will the truss brace the mast, thus admitting the use of a light mast. It also relates to a novel arrangement for supporting and steadying the mast. The inventor claims that a derrick constructed in this way will lift a load that an untrussed derrick of this size and character would not sustain, and as lightness is an important element where a derrick requires to be frequently moved, this one will be especially convenient and useful.

UMBRELLA RUNNER.—A. Good, S. F. This is an arrangement for securing the braces of an umbrella in the runner which moves on the handle so they can be readily detached therefrom and replaced when necessary. The runner can be cheaply manufactured and is extremely convenient because any person can secure the frames from the runner with very little trouble when the umbrella or braces are to be reframed, and replace them when desired.

HAY CUTTER.—John Weichart, S. F. This covers an automatic arrangement for feeding straw to the knives of a feed cutting box. The device is so arranged that it gives the straw a forward thrust after each knife passes the end of the box, thus projecting a sufficient length of straw for the succeeding knife to cut and leaving it stationary while the knife is in the act of cutting. By the means adopted the straw is fed regularly at the proper instant and is not forced against the knives.

OPERATING WINDOW SASHES.—James Kelly, S. F. This invention relates to certain improvements in operating window sashes, transoms and other doors or devices which are suspended so as to turn about an axis, and which may be situated out of convenient reach. It consists in a combination of a rotating axis with certain levers which communicate with a set-screw or knob, so that by a slight movement of the knob the window may be opened or closed, and may be secured at any point by a turn of the knob.

KOHLER & CHASE'S NEW BUILDING.—A handsome building for Kohler & Chase, the enterprising music dealers of this city, whose names are familiar to our readers, has just been completed on the corner of Ninth and Washington streets, Oakland. It is the most conspicuous building and the only full four-story structure yet completed in that city. The building is constructed of brick, iron, stone and wood, and is as far as possible earthquake proof, and has been put up in good as well as substantial style. Newsom Bros., the architects, have succeeded admirably in planning the building for its special requirements. The cellar runs out to the edge of the sidewalk, and affords an excellent place for storage. The store on the corner is used by Kohler & Chase as a music store, and is very handsomely fitted up. The upper floors are used as a lodging house, the rooms being arranged in suites. The arrangement of the rooms is such that each suite is independent of the others, so that the occupants have more seclusion than is common in such cases. All these rooms are handsomely furnished, and are now occupied. A feature of the building is the great number of large, bow windows, making it essentially Californian in appearance, and very light and warm. The edifice is surmounted by an ornamental tower, which affords opportunity for an excellent view of the surrounding country. The entire structure, externally and internally, is an ornament to the city and a credit to the owners and architects. It cost about \$75,000.

PHOTOGRAPHIC MATERIALS.—E. & H. T. Anthony & Co., of 591 Broadway, New York, are among the largest manufacturers of photographic materials in the United States. Their goods are furnished to local dealers everywhere, and their names are familiar to all photographers. The illustrated catalogue of this firm, which will be sent on application, gives a list of articles manufactured by them, which would astonish one not knowing how many accessories are needed in a first-class photographic gallery. It includes camera boxes, lenses, presses, backgrounds, cottons, collodions, varnishes, head-rests, back supports, chairs, negative boxes, photographic tents, retouching frames and pencils, glass pans and baths, and all the thousand and one things used by photographers. They also manufacture all the chemicals used in the art. The goods are all made of first quality, a fact which has brought the firm's name to the position it occupies.

The attention of our mining readers is called to the card of Mr. Henry Sewell, M. E., in our advertising columns. Mr. Sewell, who is well-known on this coast, makes a specialty of the reduction of native sulphur ores by the Sicilian method, and the smelting of argentiferous copper ores by the method practiced in Chile.

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Information Wanted.—Any information as to the whereabouts of Mr. John Donohue, who left Ireland for Idaho City, in April, 1870, will be thankfully received by a friend that is inquiring for him. Address P. O. Box 2361, San Francisco, Cal.

METALS.

[WHOLESALE.]

WEDNESDAY, M., February 13, 1878.

IRON.—		
American Pig, ton.....	28 00	@ 30 00
Scotch Pig, ton.....	28 00	@ 30 00
White Pig, ton.....	28 00	@ 30 00
Oregon Pig, ton.....	28 00	@ 30 00
Reinforced Bar.....	21 00	@ 31 00
Horse Shoes, keg.....	5 00	@ 6 00
Nail Rod.....	—	@ 73 00
Norway, Oval.....	—	@ 71 00
COPPER.—		
Sheathing, lb.....	34 00	@ 35 00
Sheathing, Yellow.....	21 00	@ 22 00
Sheathing, Old Yellow.....	12 00	@ 13 00
Composition Nails.....	24 00	@ 25 00
Composition Bolts.....	24 00	@ 25 00
STEEL.—		
English Cast, lb.....	13 00	@ 14 00
Anderson & Woods, ordinary sizes.....	15 00	@ 16 00
Drill.....	15 00	@ 16 00
Flat Bar.....	14 00	@ 15 00
Plot Steel.....	81 00	@ 123 00
TIN PLATES.—		
10x14 I O Charcoal.....	7 50	@ 8 50
Bacon Tin.....	22 00	@ 24 00
American.....	17 00	@ 17 00
ZINC.—		
By the Cast.....	9 00	@ 10 00
Zinc Sheet 7x3 ft, 7 to 10, lb.....	9 00	@ 10 00
7x3 ft, 11 to 14.....	11 00	@ 12 00
8x4 ft, 8 to 10.....	11 00	@ 12 00
8x4 ft, 11 to 10.....	11 00	@ 12 00
NAILS.—		
Assorted sizes.....	3 15	@ 3 25
QUICKSILVER.—		
By the lb.....	43 00	@ 45 00

LEATHER.

[WHOLESALE.]

WEDNESDAY M., February 13, 1878.

Sole Leather, heavy, lb.....	25 00	@ 26 00
Light, lb.....	22 00	@ 24 00
Jodot, 8 Kil, doz.....	48 00	@ 50 00
11 to 13 Kil.....	55 00	@ 57 00
14 to 19 Kil.....	59 00	@ 60 00
Second Choice, 12 to 15 Kil.....	55 00	@ 57 00
Ocellian, 12 to 15 Kil.....	55 00	@ 57 00
Females, 12 to 13 Kil.....	63 00	@ 67 00
14 to 15 Kil.....	71 00	@ 75 00
Simon Ulmo, Females, 12 to 13 Kil.....	58 00	@ 62 00
14 to 15 Kil.....	65 00	@ 67 00
16 to 17 Kil.....	72 00	@ 74 00
Simon, 13 Kil.....	61 00	@ 63 00
20 Kil.....	65 00	@ 67 00
24 Kil.....	72 00	@ 74 00
Robert, 12 to 15 Kil.....	55 00	@ 57 00
Kips, French, lb.....	1 00	@ 1 35
Cal, doz.....	40 00	@ 60 00
French Sheep, all colors.....	8 00	@ 15 00
Eastern Calf for Backs, lb.....	1 00	@ 1 25
Sheep Roams for Topping, all colors, doz.....	9 00	@ 13 00
For Linings.....	5 50	@ 10 50
Cal, Russet Sheep Linings.....	1 75	@ 4 50
Boot Legs, French Calf, pair.....	4 00	@ 4 75
Good French Calf.....	4 00	@ 4 75
Best Jodot Calf.....	5 00	@ 5 25
Leather, Harness, lb.....	35 00	@ 38 00
Fair Bridle, doz.....	48 00	@ 72 00
Sidling, lb.....	33 00	@ 37 00
Wool, doz.....	30 00	@ 50 00
Buff, ft.....	18 00	@ 20 00
Wax Side.....	17 00	@ 18 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, February 13, 3 P. M.

LEGAL TENDERS in S. F., 11 A. M., 97 1/2 @ 98. **SILVER**, 3.25 @ 3.30. **GOLD** in New York, 102 1/2.

GOLD BARS, \$90 @ \$10. **SILVER BARS**, \$215 @ cent. discount.

EXCHANGE on New York 1%; on London bankers, 40 1/2. Commercial, 50; Paris, five francs @ dollar; Mexican dollars, 94.

LONDON CONSOLS, 95 7/15. **Bonds**, 105 1/2. **QUICKSILVER** in S. F., by the flask, \$1.40 @ 1/4 lb.

Signal Service Meteorological Report.

Week Ending February 12, 1878.

HIGHEST AND LOWEST BAROMETER.						
Feb. 6.	Feb. 7.	Feb. 8.	Feb. 9.	Feb. 10.	Feb. 11.	Feb. 12.
29.08	30.07	30.13	30.21	30.17	30.09	30.04
20.63	30.00	30.04	30.14	30.09	29.81	29.75
MINIMUM AND MAXIMUM THERMOMETER.						
56	57	57	55	57	61	57
48	47	49	48	49	51	46
MEAN DAILY HUMIDITY.						
65	75	73	77	81	78	69
PREVAILING WIND.						
W	SW	W	N	SE	S	SE
WIND—MILES TRAVELED.						
274	102	102	109	44	103	204
STATE OF WEATHER.						
Fair.	Cloudy	Cloudy	Fair.	Cloudy.	Rainy.	Fair
RAINFALL IN TWENTY-FOUR HOURS.						
.06	.33	.14	—	.02	1.78	.17
Total rain during the season, from July 1, 1877, 20.92 in.						

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore.

PERSONAL NOTICE

Must be served as provided in the following quotation from the law: "The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where he principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

South Overman Consolidated Mining Co.—

Location of works, Gold Hill, Nevada.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 1), levied on the twenty-sixth day of December, 1877, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Kach, Benoit.....	32	50	\$ 12 50
Kach, Benoit.....	33	50	12 50
Rosenblum, N.....	100	100	25 00
Sullivan, Thomas.....	68	25	6 25
Wilder, David, trustee.....	109	2500	625 00

And in accordance with law, and an order of the Board of Trustees, made on the twenty-sixth day of December, 1877, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the office of the Company, 328 Montgomery St., S. F., on the eighteenth day of February, 1878, at the hour of twelve o'clock a. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

DAVID WILDER, Sec'y.
Office, 328 Montgomery Street, Room 21, San Francisco Cal.

Summit Mining Company.—Location of

principal place of business, San Francisco, California. Location of works, Mineral Point Mining District, Plumas County, California.

NOTICE.—There is delinquent upon the following described stock, on account of assessment (No. 1), levied on the twenty-sixth day of December, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Aul, Geo.	130	200	\$10 00
Aul, Mrs. Geo.	133	200	10 00
Boring, J. C.	32	1200	60 00
Brown, M. B.	45	200	10 00
Hallsted, A. A.	121	500	25 00
Hallsted, A. A.	122	500	25 00
Hallsted, A. A.	123	500	25 00
Hallsted, A. A.	124	500	25 00
Hallsted, A. A.	125	500	25 00
Hallsted, A. D.	115	1250	62 50
Hallsted, A. D.	117	500	25 00
Hallsted, A. D.	118	500	25 00
Hallsted, A. D.	119	500	25 00
Hallsted, A. D.	120	500	25 00
Hallsted, A. D.	121	100	5 00
Hallsted, A. D.	122	100	5 00
Hallsted, A. D.	123	100	5 00
Hallsted, A. D.	124	100	5 00
Hallsted, A. D.	125	100	5 00
Hill, F.	37	200	10 00
Hallsted, Joseph.	106	200	10 00
Hallsted, Joseph.	107	200	10 00
Hallsted, Joseph.	108	200	10 00
Hallsted, Joseph.	109	200	10 00
Hallsted, Joseph.	110	200	10 00
Hallsted, Joseph.	111	200	10 00
Ingerson, H. H.	53	500	25 00
Ingerson, H. H.	54	500	25 00
Long, J. O.	51	200	10 00
Long, J. O.	62	200	10 00
Leonard, F. A.	49	500	25 00
Martin, A., Trustee.	26	200	10 00
Martin, A., Trustee.	81	200	10 00
Martin, A., Trustee.	82	200	10 00
Martin, A., Trustee.	98	100	5 00
Martin, A., Trustee.	100	100	5 00
Martin, A., Trustee.	102	100	5 00
Martin, Robert.	29	200	10 00
Quigley, Chas.	136	200	10 00
Outman, J. E.	42	200	10 00
Outman, E. F.	43	200	10 00
Peck, A.	114	4000	200 00
Peck, E. A., Trustee.	9	1000	50 00
Peck, E. A., Trustee.	69	100	5 00
Peck, E. A., Trustee.	70	100	5 00
Peck, E. A., Trustee.	71	100	5 00
Peck, E. A., Trustee.	72	50	2 50
Peck, E. A., Trustee.	73	50	2 50
Peck, E. A., Trustee.	74	200	10 00
Peck, E. A., Trustee.	112	200	10 00
Peck, E. A., Trustee.	113	200	10 00
Peck, E. A., Trustee.	152	500	25 00
Peck, E. A., Trustee.	153	500	25 00
Peck, E. A., Trustee.	154	1000	50 00
Purkitt, J. H.	51	500	25 00
Peck, A., Trustee.	155	3000	150 00
Turrell, M. H.	47	200	10 00
Turner, J. W.	63	200	10 00
Turner, J. W.	64	200	10 00
Turner, J. W.	65	200	10 00
Whiting, F. B.	28	200	10 00

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THOS. PENDERGAST.

HENRY S. SMITH

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One man, per day.....3 00
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From 24 to 5 per cent. of salt is necessary. In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

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TWENTY-FIFTH YEAR—1878.

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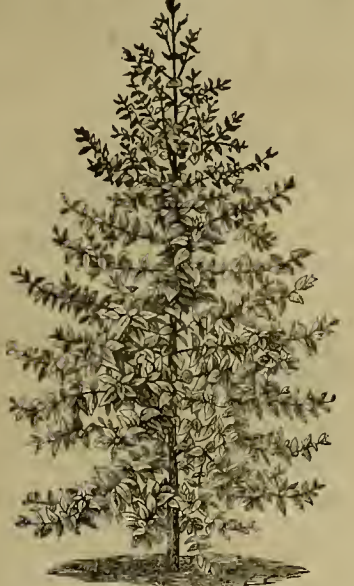
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A thoroughly studied and ably written treatise on this subject by Hon. B. B. Redding, appears complete in the PACIFIC RURAL PRESS for January 20th, and also the MINING AND SCIENTIFIC PRESS. Based upon facts, figures and careful and extensive observations made in various parts of the State on this important subject, it is a volume of reliable information, interesting to every resident of the State. The information is condensed in a paper read before the California Academy of Sciences, and is published in the Press as read before that Society without any alterations or omissions. Extra copies, post-paid, 10 cents. Address DEWEY & CO., Publishers, 202 Sansome Street, San Francisco.

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Of which 640 are secured by Government title and the balance by possessory title. It consists of
150 Acres of Rich Bottom Land,
Which is adapted to the raising of Wheat, Barley, Oats, Potatoes, Corn, Vegetables, etc., and will raise as large crops as any land in the county. There is 1,210 acres of Fine Rolling Land which is a No. 1 pasture land, and capable of keeping 1,000 head of Sheep, or 100 Dairy Cows. The whole ranch is well fenced with jacket and post and rail fence, and has eight good buildings on it, consisting of a good substantial and comfortable
Dwelling House of Six Rooms,
Two Barns, one of them 100x40 feet, and the other 40x40 feet, a Granary, Woodshed, Chicken House, and a No. 1 Dairy House, new last year. There is a bounteous and never failing supply of good soft water at both the Dwelling and Dairy Houses.
On the ranch is a large quantity of Redwood timber, suitable for all purposes. There is a
Fine Orchard of Some 300 Trees,
Of the choicest varieties of Peach, Apple, Pear and Plum, as well as a large quantity of Grapevines, Currant and Gooseberry bushes, and other small fruit. There is 100 acres sown to Wheat and Barley, which is now up four or five inches, and promises an abundant harvest in the fall.
The owner has also about 40 head of Cattle, a few Sheep, five horses, 150 head of hogs, 100 Hens, and a large supply of all necessary Farming Utensils, which he will dispose of to the purchaser at very reasonable terms if desired.
The neighborhood is as good as could be desired, only one mile from a store and one-half mile to a good schoolhouse, as well as one-half mile from a church.
The owner's reasons for selling are his wife's health and his dislike of the business. At the price at which it is offered it is the cheapest ranch in Mendocino County, as the crop bids fair to be worth when harvested, \$4,000.
Terms are \$3,000, one-half cash and the balance secured by a mortgage at one per cent. For full information, address
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A twenty-five horse-power steam engine, and all the appurtenances thereto belonging, will be sold at a bargain if applied for soon. For further particulars apply to
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Choice Grain, Orchard and Pasture Land,

Is now offered for sale at low prices and on favorable terms of payment,

In Sub-Divisions to Suit Purchasers.

The ranch was selected at an early day by Major P. B. Redding, one of the largest pioneer land owners in California. It is situated on the west side of the Sacramento River and extends over 20 miles along its bank.

The average rainfall is about 30 inches per annum, and crops have never been known to fail from drouth.

The climate is generally healthy and comparatively desirable. The near proximity of high mountain peaks give cool nights during the "heated terms" which occur in our California summers.

Figs, Grapes, Peaches, Prunes, Almonds, English Walnuts, Oranges and other temperate and semi-tropical fruits can be raised with success on most of the tract. Also, Vegetables, Corn and all other cereals ordinarily grown in the State.

A considerable amount of the rich bottom land has already been cultivated.

Deep Soil With Lasting Qualities.

The soil throughout the tilled portions of the ranch proves to be of great depth and enduring in its good qualities. It is quite free from foul growths. The virgin soil among the large oak trees on the bottom land is easily broken up and cultivated.

The California and Oregon railroad traverses nearly the entire length of the tract. There are several sections, stations and switches, besides depots at the towns of Anderson and Reading—all of which are located within the limits of the ranch.

For Colonies.

Land suitable for settlers in colonies can be obtained on good terms.

Town Lots

Are offered for sale in Reading, situated on the Sacramento River, at the present terminus of the railroad. It is the converging and distributing point for large, prosperous mining and agricultural districts in Northern California and Southern Oregon. Also, lots in the town of Anderson, situated more centrally on the ranch. Lots in both these towns are offered at a bargain, for the purpose of building up the towns and facilitating settlement of the ranch.

Purchasers are invited to come and see the lands before buying here or elsewhere. Apply on the ranch, to the proprietor,

EDWARD FRISBIE,

Anderson, Shasta Co., Cal.

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—AND—

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Caution to the Mining Public!

The undersigned proprietors of the Pacific Iron Works, San Francisco, are the only parties who are authorized to manufacture and sell the so-called White Inclined Cylinder Roasting and Chloridizing Furnace, as erected and so successfully operated at the Jefferson, Comanche, Leopard, Ural, Star, Grand Prize, Navajo, Eagle, Tip Top, Hackberry and Peck Mines of Nevada and Arizona, and in which are embraced the devices and improvements secured by the Patents No. 44,146 and No. 46,287, issued September 6th, 1864, and February 7th, 1865, to Geo. W. White, and the Patent No. 190,217, issued May 1st, 1877, to John Howell.

These furnaces all combine and embrace the improvements and combinations covered by Howell's Patent, and by which it is made practicable to expose ores at first to a moderate heat, and to gradually increase the heat on the same, as they are progressed through the furnace, which system is in accord with the well-known and long established principle and practice of roasting ore. These are the only inclined rotary cylinder furnaces which have been successfully operated—all others not embracing the Howell patent improvements and combinations having in every case proven to be miserable and expensive failures, as can be attested by all who are conversant with the facts.

The undersigned, with Mr. John Howell, are the sole owners of the Howell Patent, and we have perfected arrangements with him, and also with Mr. James M. Thompson, who is owner of an interest in the White Patents (and as such is possessed of as full and perfect rights under the same as the patentee himself) by which we have acquired the exclusive right to manufacture these valuable Furnaces for the Pacific States and Territories, and we hereby CAUTION all persons against purchasing the same from any one but ourselves, or said Howell or Thompson.

We manufacture either form of Furnace, having the full or the partial brick-lined cylinder, as purchasers may prefer, but either form embrace Howell's patented improvements, as well as the original inclined revolving cylinder, covered by the White Patents.

We have also recently greatly improved the furnace in its mechanical construction, of which all will be convinced who may favor us with a call.

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For PANAMA and New YORK, calling at Acapulco,
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Hereafter the Panama steamers will leave on the 5th and 19th of each month.
Tickets to and from Europe by any line for sale at the lowest rates.

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\$10 additional is charged for passage in Upper Saloon.

DAKOTA..... February 20th.
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Olympia, connecting at Tacoma with Northern
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Tickets must be purchased before 11 A. M. on day of sailing.
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CHARGES.—Assaying \$3; Testing, \$2 per metal.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, FEBRUARY 23, 1878.

VOLUME XXXVI.
Number 8.

A New Dredging Pump.

The recent unsuccessful attempts to raise the auriferous deposits which are supposed to exist on the bottoms of those rivers from whose banks the early pioneer was wont to reap a rich harvest, have induced some of our mechanics and inventors to investigate the matter of dredging machines suitable for this purpose, with a view to producing one better adapted for raising the conglomerates of earth, stones and gravel with which such deposits are intermixed. Several improvements on previously existing machines have been suggested and patented, but none of them, so far as we are aware, have met all the requirements of a mining dredge. A machine for this purpose must have capacity, durability, simplicity and no contractions or valves to obstruct the free passage of this water and material through its conduits.

Last summer a company was incorporated in this city under the name and style of the American Dredging and Mining Company, whose object was (among other things) to provide improved machinery for doing this class of dredging. This company has just completed a new machine for raising earthy and gravelly deposits, which is not only a novelty in dredging machines, but is a piece of astonishing mechanical ingenuity, because of its extreme simplicity and its extraordinary capacity and also its perfect adaptability for raising water and gravelly deposits from their subaqueous beds. The company has constructed one of these machines at the corner of Mission and Fremont streets, in this city, and have provided arrangements for exhibiting its wonderful capacity in actual operation. It is described as follows: The lifting power is a vacuum produced by centrifugal action. The centrifugal machine is simply a solid wheel or disk, which is secured horizontally to the lower end of a vertical spindle, and which is provided with radial passages extending from its center to its circumference. These radial passages communicate with a central passage which leads down through a hub-like extension on the underside of the wheel or disk. The disk is mounted in the upper part of a case or chamber, the lower portion of which is shaped like a hopper, while the upper part or cover is an inverted frustum of a cone. The suction pipe, through which the water and earthy material are raised, is stationary and extends down through the case to the bottom of the river, bay or excavation in the usual way, and its upper end terminates close to the end of the hub-like projection of the wheel or disk, so that the hose or passage in the suction pipe is in line with the bore or passage in the hub. As stated above, the end of the projection and the end of the suction pipe come close together, but they do not touch each other. A groove is made in the face of one of these abutting ends surrounding the bore or passage, and this groove is connected by a pipe with a small force pump which forces clear water into the groove at a higher pressure than the pressure in the passage inside the joint or in the chamber outside the joint, thus excluding all mud, sand or gravel from between the moving faces by the superior pressure of the water as it issues from the joint both inward and outward. At the lower part of the hopper-shaped bottom of the chamber, the discharge pipe commences and curves upward outside the chamber, as far as desired, or leads to a distance from the machine where the material is to be deposited. Power having been applied to drive the wheel or disk at a suitable rate of speed, the water is then primed by filling it with water, if the machine is situated or operated above the surface of the water, and the air is allowed to escape simultaneously through an air-pipe provided for the purpose. The speedy revolutions of the disk will then throw the water and material from the radiating passages against the diverging sides of the cover or upper part of the case whence it falls into the hopper-shaped portion and is forced out through the discharge pipe by the accumulating pressure of material in the chamber. If the machine is submerged, no priming is necessary, as it will prime itself.

It will be noticed that the machine has no

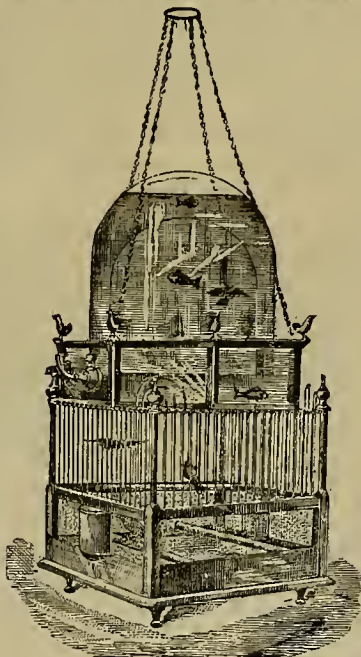
valves or contractions to obstruct the free passage through it of the mud, sand, gravel or other substance that enters the nozzle of the suction pipe. The pipe is so adapted as to provide a gradually increasing area towards the point of discharge, so that the material cannot choke or clog in the passages.

This dredge has been examined by a number of mechanical and hydraulic engineers, among them Prof. Davidson, and Col. Mendell, of the U. S. Army, all of whom have pronounced it "the simplest and most effective apparatus for the purpose that they have ever seen."

The machine is the invention of Mr. Eugene Moreau, one of our most ingenious and skillful mechanics. The company has applied through the MINING AND SCIENTIFIC PRESS Patent Agency for letters patent covering the invention in this and foreign countries. For further particulars, address Geo. W. Deitzler, President of the American Dredging and Mining Company, No. 426 Montgomery street, S. F.

Ornamental Aquarium and Bird Cage.

The very pretty combination of bird cage and aquarium, shown in the accompanying engraving.



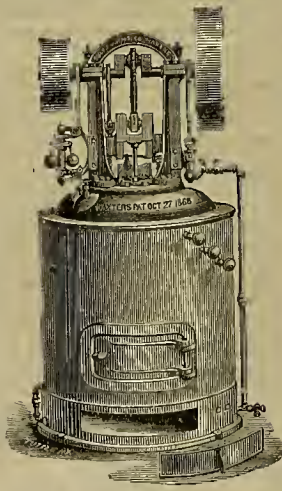
BIRD CAGE AND AQUARIUM.

ing, is formed by an ingenious application of philosophical principles, on a plan devised and patented by Matthew Palen and Daniel Sexton. The invention consists in constructing an aquarium in such a manner that a portion of the water can be raised into a chamber, which extends above the level of the water in the main tank, so that the fish can pass from the main tank into the elevated chamber and back again. By combining this style of aquarium with a bird cage, a very pretty effect is produced, as the birds appear to be flying about in companionship with the fish, and at first glance it is hard to tell whether the inhabitants of air are in the water or inhabitants of water in the air. The air is exhausted from the top of the receiver and the water flows in and is sustained there by atmospheric pressure. The invention can be applied in this and various other ways, so as to give peculiar and apparently mysterious effects. Those wishing rights to this invention, may procure them reasonably by addressing Matthew Palen & Co., care of Dewey & Co., 202 Sansome street.

OFFICERS of the Postoffice Department estimate that the revenues of the Department are suffering not less than \$250,000 per month by the flood of stamps sold by Postmasters at small country offices at a discount for use in cities and towns.

The Baxter Engine.

We illustrate herewith the Baxter Engine, made by the Celts' Arms Company of Hartford, and of which Thomas J. Fales, 18 Park Place, is agent in New York, and Baker & Hamilton, 13 to 19 Front street, are agents in San Francisco. The engine possesses many peculiarities and can be used for all kinds of machinery requiring a propelling power, and is of the capacity of from two to fifteen horse power. It is made complete with boilers, gauges, and every required attachment necessary to be successfully run. The engine occupies less space and consumes less fuel than ordinary engines. It is interchangeable in every part. This compact form of the Baxter insures strength and durability, and by reason of its light weight it can be transported at a very cheap rate by railway or by any other mode of conveyance. The two horse power occupies only two and a half feet of space, and the ten horse power only four and a half feet. It can be placed on any floor of a building where the work is required to be done, and, when placed in position any intelligent person can run it with complete safety. The cylinder of the Baxter is immersed in steam, therefore there is no liability to condensation, which avoids a great loss of power experienced by engines constructed on different principles. The crown sheet being convex, prevents deposit of sediment or the formation of scales, and as the circulation of the water in the boiler is per-



THE BAXTER ENGINE.

fect all sediment is held in suspension, and by blowing off once a week under pressure, the boiler can be kept perfectly clean. These engines have received awards at many fairs. They are no experiment, having now been long in use in many localities. The engine is built upon and secured to the cylinder, as shown in the engraving, all parts being turned and squared by lathes and planers, consequently all parts will fit properly, be in line, and correctly placed one to the other, so that no one of the parts will be thrown out of adjustment by expansion.

MINERALS FOR PARIS.—Just as the committee having charge of the mineral collections from this coast for exhibition at Paris, gave up all hopes of obtaining funds for the purpose, and signified their intention of abandoning the idea of making the exhibit, Mr. J. W. Mackay, of the "bonanza firm," comes forward in time to save the credit of the State, by generously offering to pay all the expenses of the exhibit. The collection will therefore be completed, and sent on, and the committee urge all those interested in mining matters to send forward specimens, so that they may make a creditable display. It is understood that Mr. H. G. Hawks will take charge of the exhibit at Paris, he having prepared and arranged the specimens here. Mr. Mackay deserves the thanks of the mining community for his generosity in furnishing the funds for carrying out this project.

Quartz Mill Tailings.

A great deal of complaint has been made from time to time on the question of ownership of tailings from quartz mills. It has been the custom to leave the tailings to the mill men, no matter to whom the quartz belonged. In the case of custom mills no other arrangement can be very well made, as it would be impossible to segregate the different lots of tailings. This fact has been taken advantage of, to the detriment of stockholders. People would get in as directors of a mining company, and make a contract for milling the quartz for a year at a mill in which they were interested. The mill would work up to 50% or 60%, and the balance would go into the tailings. As the directors had little pecuniary interest in the mine and a great deal in the mill, this plan of operations would be good for them but had for the owners of stock in the mine. The tailings could be worked at pleasure, and there being no expenses of mining to undergo, or of crushing, the stuff put through the second time would net more than it did the first time. As has been well understood, many mines have been run simply for what is known as a "milling proposition," that is to say there was more to be made in the milling than the mining part of the business. These facts are well known, and although many attempts have been made to break up the system, it is still in vogue. To obviate any further stealings in this line, Johnson, of Sacramento, will shortly introduce the following bill in the Legislature, in accordance with previous notice:

SECTION 1. It shall be the duty of the directors, trustees or managing officers of any mining corporation organized under the provisions of the laws of this State, or doing business in this State, to work or cause to be worked, the tailings of the mines owned or operated or managed by said corporation for the benefit of said corporation and its stockholders; and it shall be unlawful for the directors, trustees or managing officers of any such corporation to work or cause to be worked said tailings in any other manner, or to make any contract or contracts with any person or persons or corporation by which the tailings of the mine or mines owned or operated or managed by said corporation shall be given or received as payment in any manner for the reduction of the ores of said mine or mines.

SEC. 2. A violation of the provisions of section 1 of this Act shall be a misdemeanor, and punishable by a fine of not less than \$500 and imprisonment in the county jail not less than six months, and any director, trustee or managing officer of any corporation convicted thereof shall be deprived of his office, and shall forfeit \$1,000 to such corporation.

SEC. 3 This Act shall take effect immediately, and all Acts and parts of Acts inconsistent herewith are hereby repealed.

BUSINESS CHANGE.—As will be noticed in our advertising columns, the partnership heretofore existing between A. T. Dewey, W. B. Ewer, Geo. H. Strong and John L. Boone, in the Patent Soliciting business connected with this paper, has been dissolved, by the withdrawal of Mr. Boone from the firm. Our Patent Agency business will be managed, as heretofore, by Mr. Geo. H. Strong, and our clients can depend upon receiving as courteous and skillful attention as heretofore. This transaction does not in any manner affect the newspaper business of Dewey & Co. Mr. Boone intends to occupy himself principally with Patent law in the future, and has opened an office at room 57, Halleck block, No. 320 Sansome street, southeast corner Sansome and Sacramento streets. Go up in the elevator and see him. Mr. Boone has exceedingly promising talent for the new field of Patent law practice which he enters, and we wish him abundant success.

THE California Commissioners have abandoned the attempt to make any exhibit of California products at the Paris exhibition, the Legislature having failed to make an appropriation. The mineral exhibit will be sent, however, by the generosity of a private citizen of Nevada, Mr. J. W. Mackay.

The Lead Market.

We have received a review of the lead market for the year 1877, from Edward A. Caswell, a leading lead broker of New York city. He places the total supply of the United States, during the past year, at 79,549 gross tons, and the amount manufactured at 73,804 gross tons, a surplus of supply over consumption of 5,000. His prediction that the limit of low prices had been reached and that it would not fall below four cents, is not verified, as our latest quotations are three and eight-tenths cents per pound. We extract the following from his circular:

Although the prices of common lead in New York has been below five and a half cents, currency, since July 1st, and has been below four and three-quarter cents, currency, for nearly four months past, the total increase in home production of this year over last year is 15,915 gross tons, or 28%, which is greater, in point of quantity, than any yearly increase ever experienced in this country. It would seem, therefore, fair to conclude that the country can produce enough lead for its demands, even at present rates, for it must be noted that the entire supply of the year has been evenly produced. The first half of the year turned out 55% of the total annual yield. The third quarter turned out about 20% and the last quarter the remaining 25%. Virtually all the lead that has been made in the last three months, was underground, in August, when the New York price touched five cents, and it has been taken out since then in face of the facts of declining prices and discouraging prospects. If producers had been losing money ever since common lead had good-bye forever to the price of six cents in New York, would they, notwithstanding a continuance of price below five cents, have turned out in October, November and December the full average for a quarter of the year? It would certainly seem in this case that actions speak louder than words. We are still informed that all Utah will soon get finally cleaned up and shut down, and that the army of Missouri miners will no longer prospect, but fold their tents and silently steal away to parts unknown. In either case the price of lead would advance, unless meanwhile the high-grade silver ores of the Far West are sufficient to entirely supply the country, and while this result is without question probably a few years hence, it is equally an impossibility to-day.

It would be a natural deduction to presume either that at six cents in New York, lead producers were making enormous profits or else were being ruined with lead at four cents. Such, however, is not the case. With the decline in lead have come greater economy in mining, more care in dressing and concentrating ores, less loss up the chimney and reduction in the cost of labor, material and freights, so that thousands of dollars, which were formerly thrown away because there was still a profit, are now necessarily saved in order to make a profit.

The dangerous competitors of Missouri miners, to-day, are not reductions in the tariff, but increase of the argentiferous lead productions. Territories which have advanced the figures of their collective output in five years' time by steadily increasing steps from 13,000 tons to over 45,000 tons, may well be regarded with apprehension and their growth be watched with jealous interest.

Economy in Working Mines.

The Gold Hill News, says: Many cases could be cited where mines lying side by side on the Comstock could have often times saved to the present stockholders thousands of dollars had they been operated together in a friendly spirit. It has often occurred, sometimes through cases of contending titles and sometimes without any apparent reason, that drifts when opened between two neighboring mines have been closed by the one party or the other, thus cutting off the cooling, health-giving ventilation so much needed and leaving each to struggle with the situation as best they could, when by making proper connections and assisting in the ventilation of each other's mines, their men would have been enabled to do double the amount of work, and the speed with which their prospecting could be performed have been greatly accelerated, as well as the cost diminished.

Many of our mines cover a small space of ground, and if properly worked together, by means of joint shafts and hoisting machinery, might save at least one-half of the first cost, as well as one-half of the cost of running, to each mine. In addition to this, how much more economical it would be for mining companies to join together in driving prospecting drifts and winzes for ventilation on the lines of separation, each paying one-half the cost. One set of hoisting works, and shaft with three or four working compartments, would be amply sufficient to drain and work 1,200 feet of ground at any point on the lode. Some of our mines, for instance the Consolidated Virginia and California, are worked in this way, greatly to the advantage of each company. Even in the case of disputed titles, how much more manly it would be for two mining companies to quietly prospect the disputed ground if they wish, make all proper air connections in a friendly spirit, and then go into a court of law and settle their claims in a legal manner. No matter how much fighting they may do, or how many lives are sacrificed, that is what must be done in the end; and certainly, if this were done in

a peaceful and friendly manner, it would be far better for all concerned.

Times are too hard and the outside stock-holding portion of the people too poor to have a dollar of their money expended unnecessarily. The plea may be made that when such agreements are made between two mine managements that one or the other may not fulfill their part of the contract in keeping shafts and drifts open and in proper repair. In such cases let the strongest legal contracts be drawn, and each company be bonded in the premises—not only that, but in case of carelessness or neglect on the part of either to perform their proper duties, the other contracting parties should be fully empowered to do it for them, and then to charge up the cost as confessed judgment and collect it as such. The Hale & Norcross, Savags and Gould & Curry mines have just such working agreements now, and it certainly would be well for many others of our mining companies to follow the example they have set.

Out in Bodie.

Judge Knox, of this city, yesterday received a letter from Bodie from an acquaintance who recently went to that camp from the Comstock. The letter is dated February 2d, and the writer appears to be well pleased with the camp, though he and a big storm struck it at about the same time.

The writer says: "It began storming two hours after I landed, and continued four days and nights, and I do think it was the severest I ever witnessed. After the storm cleared away we rented a shop and made sleds. Since then I have had jobs at building, and am making about \$6 per day, with a prospect of plenty to do if the road keeps open so that material can be had. Some teams came in yesterday that were out 15 days between Carson and this place, and some have been four days in coming here from Aurora, a distance of 10 miles.

"I think Bodie bids fair to be one of the liveliest camps on the coast next summer. There appears to be no longer a doubt in regard to the richness of the mines, and so far as I am informed they are not confined to a small district, but extend south to Mono lake, and perhaps much further.

"The town of Bodie is situated on a flat, said to be 2,000 feet higher than Mount Davidson. God knows it is high enough for me! The flat is about two miles in length by half a mile in width, and contains at present about 175 or 180 houses and cabins. All classes of business are represented. We have hotels, restaurants, stores of all kinds, blacksmith shops, tailor shops, jewelry shops, and plenty of whisky mills and other mills that will not be mentioned.

"As regards mines, the Syndicate have a mill in Bodie Canyon and are taking out ore of high grade; the Bechtel are taking out ore of good quality; the Standard company also have a valuable mine, with a mill in full blast. These mines, with others not mentioned, are situated east of the town on the apex of the mountain, 600 to 800 feet higher than the town.

"The Standard mill is on the flat east of town, and they have a tramway from the mine down to the mill, a distance of 1,000 feet, for transporting the ore from the mine to the mill. The ore is carried in iron buckets on a wire cable on the principle of an endless chain.

"There are other mines in the same range, which I will merely mention. These are the McClinton, the Bellevue, Bodie, South Standard, Red Cloud, ex-Governor Blaisdell, Superintendent; Black Hawk, Sam. Ferguson, Superintendent; Aurora Tunnel, and Champion, the latter bonded to John Wagner, of Carson, for \$40,000. All these mines are within one mile and a half of this place, and there are others still further south—the Bull-whacker, University, Glen, Orient, Mary Ann and many more.

"Tell all who talk of coming to Bodie to speculate without money to stay at home, as the place is overrun with men seeking employment; and, in addition to that, nothing but coin buys grub here—cheek will not do."—*Virginia Enterprise*.

TRICKS THAT ARE VAIN.—One of our mine owners recently contracted with a couple of brawny miners to sink a shaft on his claim to the depth of 100 feet. The men went to work with a vim, and at the end of a month reported the work completed and ready for inspection. The gentleman had furnished them with a rope 100 feet long for hoisting purposes, but, to have a sure thing on the measure, he took along a tape line. On arriving at the shaft, one of the miners descended, and all of the rope reeled off of the windlass, proving that it was 100 feet deep, but to make assurance doubly sure, he fastened a stone to the end of his tape line and let it down until it played out the same number of feet. That satisfied him, and he paid the men \$500 for their month's labor. They left for Grass Valley, Cal., and a week afterward the owner again visited the location and made the singular discovery that the shaft had shrunk 25 feet and was only 75 feet deep. The rope had also shortened the same amount, but as there was no interested party down in the shaft to reel out 25 feet on the tape line, that article held out. Now he says that "for ways that are dark and tricks that are vain, these miners were peculiar." He figures his loss at \$125 on the 25 feet, and the price of 25 feet of braided rope, cut off and thrown away. The boys did not work exactly with the "Golden Rule." The next men that try that game will probably listen to the old refrain, "Oh! not for Joe!"—*Eureka Sentinel*.

Sonoma County Mining Interests.

That Sonoma county abounds in mineral wealth is a demonstrated fact. Especially is it rich in deposits of quicksilver. As regards gold and silver we are not much inclined to believe that rich minerals of those kinds exist within our boundaries, although good traces of both are frequently discovered. Rich copper ore has been found in several parts of the county, and it is the opinion of experts that some time in the future good mines of this description will be opened on some of these partially developed ledges.

The development of our mineral resources has had, and will continue to have for some time to come, a slow growth. This is attributable to the fact that better fields for the miner are presented in some other parts of the State, and Sonoma county is regarded as an agricultural section. However, enough interest has been previously taken in our mineral wealth to lead to the discovery and partial development of some rich claims, principally cinnabar. The quicksilver excitement of '73 and '74 brought hundreds of prospectors and capitalists to Sonoma, and for a time it seemed that a new and more prosperous era had dawned for us. As many are already aware, the decline in the market value of quicksilver put a damper on the growing mining interests, and resulted finally in almost a cessation of work in that direction. During the brief season of excitement a mining town was established, many claims changed hands, tons of machinery were imported and hundreds of thousands of dollars were brought into the county. Some of the mines then located have been constantly worked, and if there has not been much profit resulting therefrom it is because the owners are holding back developments and shipments in anticipation of a rise in the price of mercury.

In the vicinity of the Geysers and also in the section southwest of Healdsburg good cinnabar mines are now in operation, the companies owning them having made improvements to the extent of many thousands of dollars. Their money has not been expended blindly, and therefore the extensive improvements are evidences of much wealth yet to be developed. We expect to see the day, and not far distant either, when the cinnabar and copper mines of Sonoma county will rank with the best on the coast.

If an interest in our mines should be stirred up in Healdsburg, so as to induce prospectors and capitalists to again flock in and make the canyons echo with the sound of the pick, it is our firm belief that it would never again be allowed to wane as it has within the past few years. Quicksilver is worth more than its present market price, and could the combination now controlling it be broken, it would need no invitation to interest capitalists in our mines.—*Healdsburg Enterprise*.

The Outlook.

The unparalleled prosperity and magnificent developments in our two principal mines, the Eureka Consolidated and Richmond, and the general outlook all along the lode is a source of encouragement and a subject for congratulation among all interested in the welfare of Eureka. The steady and uninterrupted outward flow of bullion that has characterized them for months past, and one that promises to be indefinitely continued in the future, stamp the Base range as one of the most important silver-producing regions in the world, both in scope and productiveness. We now yield the palm to only one district, the Comstock, and we are audacious enough to believe that the time will come when we will rival our lordly neighbor. Of course we do not institute any present comparison, as the output of that wonderful lode admits of none, but our prospects at the present writing are so bright that it is allowable for us to indulge in some slight exultation. From the first discovery up to date, there has been very little of the hurrah or furore that has attended almost every other camp in the State, but we have gone on steadily improving, learning more applicable processes by experiment and making the most of our resources, until we have arrived at a clear understanding of the value and extent of the grand deposits that underlie the mountains and hills in this vicinity. Deep working has proved their permanence, and, as depth is obtained, the ore bodies are more extended and of higher grade. Throughout the district the greatest activity prevails and many properties are coming into prominence by sheer merit and value of developments. Since last September we have sent abroad \$1,000,000 per month, and as spring opens and work is inaugurated, it is probable that this amount will be increased one-third. The direct effect of this state of affairs has been to start an era of improvements and the town is taking upon itself airs—substantial buildings, elegant business structures and cosy private residences going up as if by magic. Notwithstanding this increase, we doubt there being an eligible house to let in town and the demand is far beyond the supply. We are of the opinion that next summer will be the liveliest season ever experienced on the Base range, and we are home out in our opinion by the present situation.—*Eureka Sentinel*.

The great heat in the Ophir is being rapidly overcome, and work is being resumed in all the drifts and winzes to-day, so that if nothing further happens to prevent, we must soon begin to learn the true value of the recent discoveries on the lower levels of that mine.

New Mexican Mines.

A Georgetown, N. M. correspondent of the *New Mexico Herald* says: Thinking that your many readers would like to be kept posted in regard to the progress of this little hurg, I beg leave to present the following facts for the information of such as choose to know them. In the first place I will state that there are now here between 400 and 500 persons, and in the immediate vicinity 200 additional population—men who are not idle by any means, but on the contrary, are following the different occupations of mining, farming, prospecting, etc.

I might mention in regard to mining interests, that your former correspondent was mistaken in respect to the amount of work done on the different mines. The Mimbre Mining and Reduction Works Co. have now in their employ, and have had for several months, a force of over 30 men; and are furnishing to the mills more good ore than has ever been produced by any corporation in the county since the Smith & Tower bonanza. Mr. E. Weeks is also employing a dozen men in Silver city, in the "Legal Tender" mine, which bids fair to excel in the quantity and richness of its production any mine in this vicinity. Mr. Weeks is also general superintendent of the mines belonging to M. M. & R. W.'s Co. in this place, and to his personal supervision and sagacity is due much of the success which attends them. The Messrs. Smith, McGregor, Meridith & Ailman, Stevens & Walters, Holt and Moulton, and other mine-owners and lessors, are indefatigable—working day, and some of them night-shifts; and what is best are all and individually making it pay.

I might mention many others here who are doing well, but there are so many leasing and successfully so, that should I not mention all, I might give offense to others equally deserving. I will merely say that Georgetown as a mining center will eventually rank with any mining town of recent date. I had nearly forgotten to mention that David Winterburn, who has located ground about three miles from here and represents it, brought in some ore a few days since, which was pronounced by experts to be of a very high grade.

I presume I have trespassed already on your valuable space, and will merely mention in conclusion that the M. M. & R. W.'s Co. are running a tunnel on the north side of Parapet mountain, and have now entered about 350 feet. The work is being pushed forward night and day and is of great importance, as this tunnel is intended, not only as a drain, but will supersede the necessity of hoisting-machinery in order to get the ores to the surface.

There is still considerable snow on the north slopes of the mountains, which retards prospecting to some extent.

DOWN IN THE LOWER LEVELS.—Not many men who see the miners of the Savage lifted out at the top of the shaft at change of shift have the courage to descend into the lower regions of that mine. Very few even of the old residents of the Comstock would care to descend into the steaming regions below, and not one Eastern man in a thousand could be induced to make the trip after seeing the men popped out at this top of the shaft, steaming as though just lifted from out of a cauldron of boiling water. Though they are shirtless—naked as at birth from the waist up—and wear only cotton overalls, they are dripping as if but a moment out of a pond of water; yet this is all from steam and perspiration. In all this great heat men must work. The wonder is that they are able to do anything but gasp and pant. It is a place better fitted for salamanders than for men. At the head of the main incline, where they have so long been engaged in putting in the V-bob, it is as hot as in the hottest vapor baths at Steam-hoat springs. One would think that men much in such a place would be quite secure against the rheumatism. On making inquiries in this regard of an underground foreman, he said that he never knew of any of the men working below to have the rheumatism. Some of our sufferers from the disease might try this cure—might have themselves lowered into the depths of the mine, there to sit and steam through one shift per day. But for the immense quantities of ice water they drink, the men could not endure the great heat in which they are placed or the floods of perspiration pumped from their pores. They swallow gallons on gallons of it, and it never hurts them in the least.—*Virginia Enterprise*.

THE EBERHARDT TUNNEL.—Last Sunday, we paid a visit to the Eberhardt tunnel. It has now reached a length of 2,600 feet, and is being driven at the rate of between six and seven feet per day. There is no apparent change in the formation for the last 200 feet, spar and lime constituting the component parts thereof. It requires only about 400 feet more for the tunnel to reach the neighborhood of the old Eberhardt mine. In the drift run on the vein struck at the 1,000-foot, two men only are employed. The drift is in about 30 feet, with no material change, the assays only ranging about \$10 per ton.—*White Pine News*.

THE January product of the Consolidated Virginia mine was \$1,613,162. This is the largest monthly product in upwards of a year, and disappoints those who expected the mine was worked out at the annual meeting in January. The proportions were as follows: Gold, \$747,925.10; silver, \$865,636.92; total, \$1,613,162.02.

MECHANICAL PROGRESS.

Gas for Fifty Cents Per Thousand.

A Philadelphia press despatch, under date of January 12th, says: The trustees of the Philadelphia gas works, which are owned and conducted by the city government, have for some time been examining a new process for producing burning gas, thereby, it is claimed, that gas can be manufactured at a cost of from 20 to 35 cents per 1,000 feet, a great reduction as compared with the \$2.25 per 1,000 which consumers are obliged to pay in this city. By the new process it is proposed to use what is called the slack or refuse bituminous coal dust, which can be delivered here at about \$2.75 per ton, instead of the lump coal now used, for which, according to the official reports for last year, the city was obliged to pay \$6.70 per ton. Another alleged advantage in the new plan is that the dust is injected into the retorts in a continuous current of dust mingled with steam, being instantly converted into gas, purer and with less waste of time and material than by the present practice of filling the retorts with about 200 pounds of coal which has to be baked several hours to yield only 20 pounds of impure gas, leaving a residuum of 180 pounds of coke, tar, etc., and injuring the retorts by sudden cooling and heating in the process of changing and withdrawing. The inventor of the new process, a gentleman from Washington, D. C., offers this city the free use of his patent and improvements, provided the public are benefited by selling the gas to the consumers at 50 cents per 1,000 feet, which can be done, he claims, and still leave a handsome profit to the city. The gas trustees have examined the plans of the inventor of the automatic, or steam coal process, as he calls it, and have authorized him to experiment with his new method, provided the city is not obliged to pay the expense, this body not having the right to spend any of their appropriations for such purposes without the special approval of the corporation. The inventor to-day addressed a communication to the mayor, formally repeating his offer to make the city a present of the use of the patent, and guaranteeing the city a saving of from \$1,000 to \$1,500 a day on the 9,000,000 feet of gas manufactured here every 24 hours.

VALVE MOTION FOR ENGINES.—An improved device has been introduced for operating the slide valve of a steam engine from the piston rod of the engine, in such a way that the valve will be moved slightly to partially uncover the inlet and exhaust ports as the piston completes its stroke. By this means its motion is continued in the same direction as the piston begins to move upon the return stroke, until the ports are fully opened, and then stand still, with the ports fully open, until the piston has nearly completed its return stroke. The arrangement by which this is accomplished consists in the combination of a three-armed bar, two levers, connecting bar, and connecting lever with the piston rod and the valve stem of a steam engine—also the combination of a lock-bar, spring, two cylinders, and pin with the two levers and the three-armed bar. Now, as the piston approaches the end of its stroke, the upper end of an upright arm of a bar strikes the concave side of the upper part of the levers operating it, and moving the slide valve to close the ports, and admit steam in front of the piston. As the piston, therefore, begins its return stroke, the inclined upper surface of one of the side arms of the three-armed lever bar comes in contact with the lower end of the lever, and continues its motion in the same direction—the effect of this being to fully open the inlet port, which remains thus until the piston has nearly completed its stroke.

THE MANUFACTURE OF ALUMINIUM.—In the most unique factory for the production of aluminium metal in Salindres, near Alais, the mineral bauxite is heated with soda in a reverberatory furnace, the resulting aluminate of soda is extracted by means of water and alumina, precipitated by a stream of carbonic acid; this is then formed into balls, with salt and coal, and heated to a white heat in vertical retorts, during the introduction of chlorine gas. The double chloride of soda and alumina, which distills over, is fused with the addition of 35% of sodium, and 40% of cryolite as a flux, and the metal which settles at the bottom of the crucible is poured into molds. The cost of producing one keg of aluminium is stated to be 80 francs; while the selling price is 100 francs.

TURKISH CARTRIDGE WORKS.—A private letter from Constantinople, says the *Iron Age*, states that some new large cartridge works, capable of turning out 500,000 per day (or 350,000 with Turkish labor), have been commenced at Zelinbourna, on the Sea of Marmora, about four miles from Constantinople. The contract for the whole of the machinery has been taken by the Winchester Repeating Arms Co. of New Haven, U. S., who are shipping 700 tons. The rolling mill for the strip, together with furnaces and engines, and the lead-squirting presses, are in the hands of Messrs. Greenwood & Battey, of Leeds. This establishment when finished will absorb the smaller factory at present at Constantinople.

Notes on Engine Construction.

We read in English exchanges of an invention brought out by English inventors, which consists of a construction and arrangement of combination of the parts of steam-engines, whereby simplicity of construction and compactness of parts and economy in manufacture are obtained. They cast the bed, the front cylinder cover, the two bearings of the crank shaft and the guides in one piece, the lower edge of the said bed being stiffened by a flange, as well as the upper edge. The upper flange of the bed for a portion of its length is planed and forms the guide for the cross-head. They place the eccentric sheave between one of the crank shaft-bearings and the crank, and they cast a hole in the side of the bed to allow the eccentric rod to pass through. They bolt the feed-pump to the back of the steam-chest and actuate the plunger of the feed-pump by the slide valve-spindle, which is carried through a stuffing-box at the back of the steam-chest. They construct the connecting-rod of cast-steel, having in section the figure of the letter H, the small end being bored out for the brasses of the cross-head pin. The front brass has a projection cast on it, which fits a corresponding groove in the connecting-rod. Two screws, tapped into lugs on the connecting-rod, bear on the said projection of the front brass and are used for taking up the wear of the brasses. They construct the cross-head of cast-steel and a strong pin being cast on the upper side of the said cross-head; on the said pin the lower guide-slipper is placed and on this the upper slipper, lock-nuts being afterwards screwed on for the purpose of taking up the wear. The pin described on the cross-head is cast hollow and serves the purpose of oil-cup or lubricator.

TO FIND THE WEIGHT OF A CASTING FROM THAT OF THE PATTERN.—In order to determine beforehand the weight of the finished article when cast (in whatever metal), it is necessary, says the *Zeitschrift der Eisen und Stahl-Industrie*, to know that the specific gravity both of the pattern or model as well as the metal to be cast. The contraction or shrinkage of the casting must also be taken into account—in the case of iron, this is in the proportion of one to 32. If we designate in general the specific gravity of the model as s , the specific gravity of the casting as S , the ratio of shrinkage as a , the absolute weight of the model as M and that of the casting as C , we shall have the general formula:

$$C = \frac{M \times S (a-1)}{s \times a}$$

By means of this formula, the weight of the casting, C , can be calculated for individual cases. To find the approximate weight of iron castings from that of the wooden pattern, the latter is multiplied by the figures corresponding to the material as given in the following table. Very accurate results cannot be expected, as the specific gravity of the wood as well as of the iron fluctuates: Pine wood, 14.0; oak wood, 9.0; beech wood, 9.7; linden wood, 13.4; birch wood, 10.6; alder wood, 12.6; pear tree wood, 10.

GALVANIZING IRON.—The iron to be galvanized is first immersed in a bath of diluted sulphuric acid, then washed in water. The articles are then passed to a workman, who removes any scale that may still remain on the surface with a scraping tool provided for the purpose. After having passed his inspection, the iron is immersed in a bath of dilute muriatic acid, from which it is shortly taken and removed (without washing) into a drying chamber, on emerging from which it is ready for the zinc bath. The dipping process occupies about 10 to 15 seconds with sheet iron and with cast-iron objects somewhat longer. The acid and washing tubs, drying oven and metal bath are so disposed with relation to each other as to make the several manipulations as continuous as possible without loss of time. The slight incrustation of chloride which remains upon the iron after it comes from the drying room, appears not only not to interfere with the zincing but to favor the operation. With every operation a trifling quantity of iron from the object immersed therein enters the zinc bath and in course of time forms what appears to be an alloy of zinc and iron, which slowly accumulates in form of a spongy mass at the bottom of the pot, from which it must from time to time be removed with a shovel or scoop provided for the purpose, while fresh zinc must be added from time to time.

SCALE OF MODELS AT THE PARIS EXPOSITION.—The following suggestion is made by a correspondent of the *London Times*: "It may be valuable to those of your readers who intend to exhibit plans or models to know that these can be made to a scale capable of being expressed in any language. The only common measures between English feet and inches and foreign decimal scales are the numbers 2 and 10, so the only possible international scales are the following: Full size=*grandeur naturelle*; half full size, or 6 in.=1 ft.=1*la moite* ou .5; quarter full size, or 3 in.=1 ft.=.25; half quart or .25; 1 1/2 in.=1 ft.=.125; 3/4 in.=1 ft.=.0625. Or 1/10th of any of the above, viz.: 12-10 in.=1 ft.=.1; 6-10 in.=1 ft.=.5; 3-10 in.=1 ft.=.025; 3-10 in.=1 ft.=.0125; 3-40 in.=1 ft.=.00625. A drawing has only to be made to any of these scales, and marked with the English words, and the corresponding decimal will be understood all over the world."

SCIENTIFIC PROGRESS.

Science and Invention.

It is frequently asserted that it is by men of small education that great inventions are made. In a recent lecture, Prof. Becker, of the State University, says the assertion is incorrect, and cites the following instances: James Watt was a civil engineer and an accomplished scientific man; he had been connected with the University of Glasgow for years before his friend Robinson, Professor of Physics, suggested to him to try to utilize the enormous motive power of steam. George Stephenson had studied science ardently for years and had the assistance of his only less eminent son Robert, on whose education no pains had been spared, before he invented the tubular boiler, which is the essential feature of the locomotive. Electricity was first applied to telegraphic purposes by Gauss, one of the profoundest mathematicians and physicists who ever lived. The electric telegraph was independently invented and first applied to commercial purposes by Morse, who had graduated at Yale and who was Professor of the Fine Arts in another college. Whitney, the inventor of the cotton-gin, was a Yale graduate. The first practical reaper was invented by the Rev. Peter Bell, a Scotchman. Nasmyth, the inventor of the steam-hammer, was a University of Edinburgh man. The safety-lamp was the invention of the great seaven, Sir Humphry Davy. Sir William Armstrong, of the hydraulic and artillery fame, was well trained in science and studied and practiced law. The greatest farmer who ever lived was undoubtedly Liebig. Murdoch introduced the use of illuminating gas as the result of a scientific investigation on the products of the dry distillation of matter. Siemens, whose wonderful furnace and its modifications represent a yearly economy of several million tons of coal, is one of the most highly educated men alive. In short, it is only rarely that genius, deprived of the assistance of antecedent experience and thought, has been able to arrive at results which have notably modified the industrial condition of mankind. The Greenwich observatory and the astronomers who have pursued their studies in it, by rendering navigation safe and its extension possible, have contributed as greatly to the welfare of mankind as the locomotive and its inventor; and what could we do with our iron ships if the laws of magnetism, as well as those of astronomy, had not been investigated? Volta's curious experiments paved the way to the electrolyte, and Morse would have been impossible had not Franklin preceded him. To make Bessemer steel we call in the help of spectral analysis, our sugars are bought and sold according to their effects upon the plane of polarization of light, and most of our chemical manufactures are founded upon facts and laws which were discovered not in pursuit of money, but of truth. Science is not indebted to the world for the thousands it annually costs, but the world to it for tens of millions of its yearly profits.

MICROSCOPIC EXAMINATION OF CRYSTALS.—Dr. P. T. Austin, in the *London Chemical News*, gives the following method of preparing crystals for examination by the microscope as much better than the usual way of evaporating the solution in a watch-glass and rubbing with a glass rod: "If the solution be evaporated to the right consistency in a watch-glass and another watch-glass of the same size, previously warmed, he placed upon it, the drop expands to a film. The upper glass should not be pressed, but allowed to rest of itself. The film is similar to the one obtained in an animalcula, being, however, thicker. If now a few drops of ether be placed in the upper watch-glass, the cold caused by the evaporation of the ether will cause a crystallization to take place between the watch-glasses. The growth of the crystals can be quite accurately managed by increasing or diminishing the cold on the surface (by blowing on the ether). The crystals formed are, as a rule, perfect in shape. I have by these means obtained well defined crystals from solutions which, by rubbing with glass rods, afforded me only amorphous powders."

NEW CARBON BATTERY.—M. Jabluchoff, says *Comptes Rendus*, melts nitrate of potash or nitrate of soda, in which he plunges ordinary coke carbon as the active plate, the platinum as the inactive plate. Iron, or any other metal which, in presence of the carbon, is not attacked by the melted salt, may be substituted for the platinum. By adding different metallic salts, the electromotive force of the battery may be varied between two and three units; it is, therefore, superior to that of the Bunsen and Grenet batteries. The galvano-plastic deposits of the metals may be received at the inactive electrode. During the action of the battery there is a great liberation of carbonic acid and other gases. M. Jabluchoff describes an arrangement for collecting them, so that the combustion of the carbon may give simultaneously an electric current, a metallic deposit, and a motive force.

LYCAENA PSEUDARGIOLUS.—The *Canadian Entomologist* contains notes on this butterfly with its larval history fully recorded, by the distinguished Virginia entomologist, W. H. Edwards. It is a paper of great interest to students of the lepidoptera. The *Entomologist* begins the new year with an excellent number.

Simple Illustrations of the Laws of Gravity.

Teachers can do much to impress scientific facts and laws upon the minds of their scholars by using simple illustrations. A hint of this is given by Thomas B. Lovell, in *Barnes' Educational Monthly*: Some years ago I heard an excellent teacher lecture on a subject pertaining to astronomy, in which he made use of several experiments. First, to illustrate that a body will always revolve on its center of gravity; second, to show why the earth is flattened at the poles. These experiments could be performed by means of apparatus found in almost every schoolboy's pocket, namely, a piece of string, a lead pencil or a short stick, and a piece of brass or steel chain not larger than a small watch chain. Tie to the middle of a lead pencil a piece of string about three feet long. Suspend so that the pencil will balance itself. Now twist the end of the string between the thumb and the first finger of the right hand, steadying and holding the string with the left hand. A circular motion will thus be communicated to the pencil, and it will revolve around the point on which it is suspended. Tie a piece of white string around the middle of the pencil, or its center of gravity, simply to show the position of that point. Now, again tie the first piece of string half way between the end of the pencil and the center of gravity, and communicate the circular motion described above, and we shall observe that the pencil will still revolve around its center of gravity, the point marked by the white string being at rest. It can thus be shown that anything, of whatever shape, will revolve on its shortest diameter. If the end links of the chain referred to above be hooked together, and the string tied to a link and the circular motion given, it will be observed that the chain begins to take an elliptical form, which gradually approaches that of a circle, until at last it becomes a circle and then it revolves horizontally. This shows that even a ring is subject to the same law, that is, revolves on its shorter axis, the center of gravity. Simple as this experiment is, it illustrates the revolution of the earth on its shorter diameter.

Analysis of Colored Leaves.

Prof. A. H. Church, of the Royal Agricultural College at Cirencester, England, in the course of some investigations concerning chlorophyll (the green coloring matter of plants) was led to look into the chemical composition of the different parts of variegated leaves, and the results he has reached, and which are reviewed in the *Journal of Chemistry*, are exceedingly interesting. The experiments were made upon three plants, having green leaves variegated with white patches, or bearing both green and white leaves: a maple (*Acer negundo*), an ivy (*Hedera helix*), and a holly (*Ilex aquifolium*). The leaves were carefully galled without the use of knife or scissors, and were put into weighed bottles so that no moisture could be lost on the way to the laboratory. Such leaves only were taken as could be fairly compared in age and state of growth. The water, the combustible or volatile matter, and the ash were first determined; and the following are the tabulated results:

	Maple.		Holly.		Ivy.	
	White.	Green.	White.	Green.	White.	Green.
Water	82.83	72.70	74.14	62.33	78.88	66.13
Or. mat'r	15.15	24.22	23.66	35.41	18.74	31.63
Ash	2.02	3.08	2.20	2.47	2.38	2.24

The watery character of the white leaves, and their comparative poverty in combustible or so called "organic" constituents, is very marked. The fresh green leaves of all three plants contained about one-third more solid matter than the white leaves. The mineral matter or ash, when not absolutely more abundant in the white leaves, forms a larger part of their dry matter.

Of the matters soluble in ether, including wax or fat, resin, chlorophyll, and several other organic compounds, fresh white ivy leaves contained 1.29%, the green giving 3.27%. Similarly, white-holly leaves contained 1.75%, and green-holly 2.54%.

Even more remarkable differences in composition between white and green leaves were noticed on submitting the ashes of the several plants to quantitative analysis. It was observed that in the ash of all three plants there is the same kind of difference between the white and green parts. In the ash of the white parts potash abounds, and in the ash of the green parts lime; while in the ash of the white parts there is invariably a higher proportion of phosphates than in that of the green. There is, however, no indication that the presence of chlorophyll in the green parts involves a higher proportion of iron.

The experiments suggest an explanation of certain facts in the cultivation of variegated plants which have hitherto been inexplicable; as, for instance, that in some calcareous soils many such plants quickly revert to their normal green state.

CRYSTALLIZED GLASS.—M. Videau, director of the Blazy glass works, says the *Journal of Chemistry*, has obtained some fine specimens of crystallized glass from a crucible that had been running for eight months and a half in Siemens furnace. He hopes to obtain still better crystals, together with the "mother waters," from a furnace that seems likely to act for nine or ten months.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

WABASH.—*Amador Ledger*, Feb. 16: This mine is located close to the Talisman, near Amador City. It was some months ago bonded for one year by Mr. Hammack, who immediately set to work to develop it on a small scale. He put up an astra, worked by a horizontal wheel by water power. This contrivance is capable of crushing about 1,300 pounds of quartz per day. Since the commencement of work numerous delays have occurred, owing to the uncertainty of the water supply. The richness of the ore so far crushed has exceeded expectations, and argues well for future prosperity. Three clean-ups have been had, all of which have yielded handsomely. The general average has reached the neighborhood of \$20 per ton. The present depth of the shaft is 40 feet, with a three-foot ledge at the bottom. In the honing of the property, Hammack has struck a good thing. He sees a fortune dancing tantalizingly before him, which threatens to slip from his grasp, owing to the meagre crushing facilities at his command.

BUNKER HILL.—This property looms up today as the richest mine in the county. Latterly the ore-body has opened out, unexpectedly rich. We understand that two ledges are being operated, one two feet and the other six feet in thickness. While both ledges are above the average, yet the smaller one is the richer of the two, and is perhaps the finest seam of quartz discovered on the line of the mother lode in Amador county for many years. An idea of the wealth may be gained from the fact that the last clean-up from both veins averaged \$35 per ton. When in Amador City the other day, we heard that the outlook is so encouraging that 10 more stamps are to be added to the mill forthwith—making 20 stamps in all—also, that the company contemplate building a car track from the mine to the mill—a distance of nearly half a mile.

KEYSTONE.—This magnificent property—the basis of Amador City's prosperity—move on in the even tenor of its way. The rock now being put through the mill is somewhat lower in grade than the average ore from this mine; nevertheless it is of good paying quality. The lode is in places 40 feet thick, all of which goes to mill. Little prospecting is going on, the immense size of the vein rendering exploration unnecessary at present. There is one thing for which the Keystone company are deserving of praise, and that is the regularity with which the employees are paid.

PLYMOUTH.—In this section, we are having one of our old-fashioned winters, when the dews of heaven fell, not in mist, but poured down in torrents. Every gulch and creek is filled with a roaring, turbulent tide. Farmers hereabout are unanimous in the idea that they have got all the water they want for the present. Miners are also satisfied and willing to cry, "hold, enough!" But quartz-mill men are still shouting to the clerk of the weather to pour it down and bring on a second edition of the deluge. Last week, the Phoenix mill had to be stopped for want of ore. When the 80-stamp first started this season, there was about 3,000 tons of ore on the dump. All this has been reduced. To keep the mill running to its full capacity, 160 tons of ore must be taken out daily from the south shaft. The new and powerful hoisting machinery is now being placed in position over the south shaft. Superintendent Jones is equal to the emergency and will see that the requisite amount of rock will be forthcoming.

HOISTING WORKS AFLOAT.—D. R. McKilligan's hoisting works, on his quartz lode, near the forks of the Cosumnes, started, during the late storm, en route for El Dorado county. Whether they are still navigating towards Oregon, or have called a halt, your correspondent knoweth not.

LUTE.

LAVA BEDS.—Mining in the Lava Beds has been almost suspended by the recent rains. Chinamen will not work in places where the banks are liable to cave if they can help it. It takes but a few lessons in dangerous mining to make them wide awake to anything that looks dangerous. In the gulches and ravines there is an abundance of water, and if there is any gold at all, it is dug out without much trouble. So far the returns from the small mines have not been great, but there is snow sufficient to keep up the water till late in the year.

CALAVERAS.

GRAVEL MINING.—*Calaveras Chronicle*, Feb. 16: We have never seen so much vigor shown by our gravel miners as they are evincing at present. Everybody is at work and operations are being pushed with a vim that can't help being successful. At the Garland mine in Chile gulch—now owned by Jilson & Co.—work goes on apace. A full force of drifters is employed and the mill—the gravel has to be put under stamps—is kept constantly running. Results, good. Brown & Co., the Tunnel ridge tunnelers, have reached the channel and are doing well. The gravel is hard to wash, and they will probably yet get as much out of the tailings as the original yield. They have ground sufficient to last them for years. In the well-known Duryea claim there is no cessation of

operations at all. Gravel is "drifted" as fast as the stamps can render it fit for washing. Veith, the great hydraulicist, works like a Trojan. The harder it storms the more enthusiastic he becomes and the faster he labors. Operations in his claim never lag. He always has a full head of water on and will clean-up a gunny sack full, pretty soon, as he deserves. Moser & Co. are also putting in their "best licks" and making 'em tell. Their claim is now very advantageously arranged and with the aid of a big head of water they are enabled to keep their flume running full. Moser & Co.'s receipts this year will be a nice fortune. Emerson, the Happy Valley gravel washer, is happy. He keeps 400 inches of water, under a heavy pressure, working for him. W. W. Cook, keeps piping away in his claim near the French Hospital. We understand that his claim is looking first-rate and yielding steadily. Cook, Raynor & Cook, proprietors of the Calaveras hydraulic, are piping steadily, a ditch owned by themselves supplying an abundance of water. Sliter & Co., who lately located in Old Woman's gulch, are doing first-rate. Quite a number of hands are employed and the prospects are excellent for the development of a first-class mine. The gravel is difficult to wash and we understand that the proprietors are already making arrangements for the erection of a mill.

INYO.

PROSPECTING.—*Inyo Independent*, Feb. 16: Callihan, Peel and others are working a promising ledge in the new Goldopolis district, in the Inyo range, some twenty miles northwest from here. They are building an astra for working the ore. Billy Lake is doing the assessment work on a large silver ledge nearly opposite Fish Springs. John R. Hughes and others have a small force at work in the new Beveridge district, referred to in an extract elsewhere.

REX MONTIS.—The Rex Montis mill, the pans of which were started up on tailings, was disabled and shut down on account of the bursting of one of the new Stevenson pans. Superintendent Hutchings immediately started to the Bay after new ones—those with wooden sides, probably. Work still goes on at the mine, though there is now no communication with those fellows up in the clouds and snow.

SILVER PEAK.—Superintendent J. B. Hiskey of the Silver Peak mine and mill, is conducting extensive operations over in that region. On the work are employed some fifty men, developing, erecting a new mill, etc. Bullion to the value of \$50,000 has been shipped so far, but a drop compared to what will be produced when the new works and processes are complete. This is a heavy New York company.

NEVADA.

SELBY HILL.—*Nevada Transcript*, Feb. 16: The Selby Hill mining company are working their claims up to their full capacity, using 650 inches of water. On Monday last they struck a very rich body of gravel, the extent of which is not known. Several pans of it were washed out, and the prospect showed from 25 cents' worth up to half an ounce to the pan. The run will be a long one, and when they do clean up we feel confident the result will exceed the most sanguine expectations of the owners. This is the claim which, not long since, many croakers asserted would not pay. Some of the ground was drifted years ago, and paid immensely, but a good portion of it has never been worked, because it could not be done in that manner.

THE SEASON.—*Grass Valley Union*, Feb. 16: Although the continuous rains have saturated the ground our mining companies are handling the water easily where steam machinery is used. The surface prospecting operations are interfered with, but even these are not entirely stopped, and some companies have been able to keep at work. Not much quartz can be taken to mill, however, when the haul is any distance, as the roads are in a bad condition generally, but this is only a temporary disadvantage, as the general mining situation is good, and active and prosperous mining season, through the coming spring and summer, is confidently looked forward to.

A VALUABLE MINE.—*San Juan Times*, Feb. 17: Joe Bynon & Co. of Birchville, have a very valuable claim on Shady creek, near and at what is known as Hoyt's crossing, which gives evidence of being very valuable. They own the bed of Shady creek from the head of Reader & Co's claims at the Falls, to the Empire dam above, more than a mile distant from the Falls. They have put in sluices at the lower end, and are ready for washing. They have constructed a tunnel through a hill a considerable distance, and will commence washing as soon as the storm subsides. The company anticipate good clean-ups, and we hope they will not be disappointed.

DEADWOOD.—*Nevada Gazette*, Feb. 16: The topic of conversation in town yesterday was the rich strike in the Deadwood mine. The owners have done some heavy work in the mine, believing that it was only a matter of time when a fine ledge would be uncovered, and they would be fully repaid for the money they were expending. On Thursday evening last they found a lode twenty inches in thickness, and the rock will go into the hundreds of dollars per ton. Work is being rapidly pushed ahead, and in a short time the true value of the discovery will be demonstrated.

We understand that Ehaugh & Lewey, whose quartz claim is near Kitts' mill at Willow valley, are taking out some splendid rock. The last crushing yielded \$2,400, or about \$55 per

ton. The quartz mines in that section are looking better than ever before, and the prospects are good for the discovery of many valuable ledges. Previous to the storm, a large amount of prospecting had been carried on, which will be continued as soon as the weather is favorable.

The "tailings" from Maltman's sulphuret works are to be worked over by an improved process. Extensive preparations are being made in the way of new machinery, etc., and the enterprise will be under full headway in the course of 10 or 15 days.

GEO. SMITH'S mine, on the Grass Valley road, is still paying as well as usual, and the yield is verifying our heretofore expressed opinion that it is one of the best claims in the county. Large quantities of rock is being taken out, and as soon as the Pioneer reduction works mill has finished the New England mine crushing, upon which it is at present engaged, the quartz from Smith's mine will be put through.

ANOTHER crushing of 60 loads of rock from the Centennial mine, near Grass Valley, is being put through the mill, and it is believed that it will go \$200 to the load. The ledge in the mine continues regular, although small in size, and is very rich.

The gravel mine known as the Hirshman mine, situated near Wet hill, is now in full working order; they now have sufficient water to run steady, and they expect a good clean-up.

DEBRIS WASHED OUT.—*Grass Valley Union*, Feb. 19: The heavy rain of Sunday caused the water to rise higher in Wolf creek than any time since the memorable winter of 1861-2, and, as a result, the mining sediment, which has been accumulating in the bed of the stream for several years, was washed out in many places down to the bedrock.

A NICE LITTLE CLEAN-UP.—Sixteen loads of rock from the Centennial mine were crushed at the Orleans mill, last week, and cleaned up \$2,000. The had condition of the roads prevented a large crushing, but the company have more of the same kind of rock on their dump.

Two men were killed by the falling of a timber, which was being lowered into the Idaho mine, on the 11th inst. Their names were James Buckett and John Polglase, the latter underground fireman.

TRINITY.

PAYING WELL.—*Trinity Journal*, Feb. 16: Jas. G. Trotter came in from Deadwood this week, bringing with him 210 ounces of retorted gold, valued at \$3,600. This is the result of less than a month's work with the astra on Trotter, Belleau & Co.'s mine, the quantity of rock crushed being 57 tons from the big ledge. The rock was not selected, but taken just as it came from the lode. Such a prospect on the Comstock would set California streets wild with excitement.

TUOLUMNE.

THE PHOENIX RESERVOIR SAFE.—*Tuolumne Independent*, Feb. 16: The report that the slide in the Phoenix reservoir, on Sullivan's creek, was caused by the incapacity of the flood-gates not being large enough to carry off the surplus water of the creek, is incorrect, as there are no flood-gates in the waste. More than this, the waste is of a capacity to take the water of the Stanislaus river, it being, at the apron, 85 feet—that is, at the outlet—and at the mouth over 150 feet wide, and eight feet deep below high water mark. The reservoir was built without regard to cost—some \$8,000 being expended in its construction. In building the dam it was thoroughly soaked from bottom to top. Its base is 125 feet wide, and every layer of two feet was flooded and soaked as the work progressed upward, making it as solid as it was possible to be made, and up to the time of the slide was as tight as a bottle. During the season the dam had dried in from the outside to a distance of about eight feet, and so hard that the rain ran over it without penetrating or making any impression upon it. But the continuous falling of snow and rain soaked through from the top down between the dry crust and the still moist interior of the dam. This made the earth inside so soft that the outside sloughed off, and the continued rain kept the remainder of the embankment so soft that it continued to work toward the inside until it got to the water, when it required the utmost exertions of a large force of workmen, night and day, to raise the levee sufficiently high to stop the water from coming through. The force of from 50 to 60 men employed finally succeeded; and although the expense will be heavy, it will be a permanent institution in the future, as it will be next to an impossibility for it to give way, let it rain as long as it may. This reservoir supplies a large section of country, embracing Shaw's flat, Sonora, Jamestown, Algerine, Quartz mountain, Montezuma, Rough and Ready, etc., and will hold in reserve, after water falls in the ditch, a four months' supply for the district named. As will be seen, an important section of the county is interested in its preservation, and the anxiety as to its condition warrants us in giving the above facts from a reliable source.

Nevada.

WASHOE DISTRICT.

CALIFORNIA.—*Gold Hill News*, Feb. 20: Owing to the continued storms, much trouble has been experienced in hauling the ore to the mills in Six-mile and Gold canyons. The reserve of ore has served, however, to keep the mills all running thus far, so that there has not yet been any interruption to the steady bullion production of the mine. The mills on the Carson river being supplied with ore by the railroad, suffer nothing by the condition of the roads,

but are, if anything, increasing the amount of ore they reduce. The ore stops in every portion of the mine, from the 1500 down to the 1650-ft level, are yielding the usual quantities of rich ore, keeping the ore dumps full to overflowing. Sinking the C. & C. shaft below the 1850-ft station is going steadily forward, the bottom still in very hard rock and the flow of water being very strong. On the 1550-ft level the upraise from crosscut No. 2 will be connected with the winze from the 1550-ft level to-day. This will greatly increase the circulation of air and facilitate the working of that portion of the mine. The north lateral drift from the shaft on that level is now in 144 feet.

CON. VIRGINIA.—Daily yield, 600 tons of ore. The mills are all kept busy crushing and thus far in the month nothing has happened to prevent the daily yield of bullion being fully up to the usual standard. The ore-producing sections of the mine are looking well in every part; in fact, there seems no prospect whatever of any decrease of the regular monthly returns of the mine. Sinking the C. & C. shaft has been resumed and is being pushed vigorously forward, the bottom still in very hard, tough blasting ground. The flow of water in this shaft is still strong. The east drift on the 1650-ft level, running to find the east ore vein, is being steadily advanced, a diamond drill being kept well in advance to prevent an inrush of water, which might flood the lower levels and do much damage if not prevented.

OPHIR.—The lining of the pumping compartment of the shaft has vastly improved the air circulation throughout the 1900-ft level, so that work has been resumed at all points in the mine excepting in the winze east of the ore body. Nothing is being done in that yet. The face of the main south drift east of the ore body on the 1900-ft level is still in porphyry, streaked with quartz and occasional clay chips. There is some water in the face of the drift, but it gives very little trouble.

JUSTICE.—The daily yield of ore has been increased to 130 tons, the intention being to start another mill in a day or two more. The Pacific mill is kept steadily crushing at the rate of 75 tons per day, and day before yesterday cleaned up their first shipment of \$13,395. The ore stops from the 1150-ft level up to the 800-ft level of the mine are showing splendidly, and yielding ore of a good quality.

SILVER HILL.—The prospecting on the lower levels is being pushed vigorously, the recent ore discovery on the 600-ft level giving great faith that when that portion of the ore vein is reached on the 800-ft level a veritable bonanza will be disclosed. The east crosscut on the 600-ft level, in which the ore was found, is still advancing the face still in lively vein matter carrying occasional streaks of quartz, portions of which continue to give good assays of both silver and gold. This is conclusive proof that the east side of the ore vein has not yet been reached, and holds out the hope that a larger body of rich ore may yet be found in that direction.

BULLION.—The upraise from the 1840-ft level and the bottom of the main incline completed a connection day before yesterday. The connection of the two shafts was perfect, neither being an inch out of line. The upraise is now being cut out, enlarged and thoroughly timbered, so that in a few days more the incline will be in complete working order down to the 1840-ft level. This will completely ventilate the mine to that depth, and will enable the crosscutting and prospecting of a large portion of the ore vein on that level that could not before be reached on account of the great heat.

BELCHER.—The pump shaft is down 28 feet below the 2260-ft station, the bottom in hard blasting rock. The pumps are now all in complete working order down to the 2160-ft level. The main east drift on the 2160-ft level is steadily advancing, the face in very favorable quartz. The east drift on the 2060-ft level is also making steady progress, the face showing more quartz of a much more healthy character.

NORTH CON. VIRGINIA.—Sinking the main shaft is being pushed forward with all possible vigor, the bottom still being in extremely hard blasting rock. This hard rock will continue for a distance of 30 feet or more downward, judging by the stratification passed through by the west drift on the 1300-ft level. The character of the material will then become much softer. The face of the west drift on the 1300-ft level is still in a soft, favorable character of ground, and is making good progress. The east drift on the same level continues in a very encouraging description of vein matter, affording low assays of silver and gold.

SIERRA NEVADA.—Sinking the south double incline winze below the 1700-ft level is making the best of progress, five feet being sunk and timbered every day. A strong force of men are employed and the development of the lower levels is being forwarded with all the speed possible.

MEXICAN.—The east drift on the northern boundary line, on the 1600-ft level, is steadily advancing, the face still in hard blasting quartz and porphyry of a very favorable character. The great heat is gradually decreasing so that much better progress can be made.

UNION CON.—The north drift on the 1600-ft level is steadily advancing, the face in hard blasting porphyry streaked with small veins of quartz. The south drift on the Mexican line is being driven vigorously forward, the face still in hard quartz and vein matter. The prospects in the face of this drift are quite favorable.

ALPHA.—Sinking the south winze on the Imperial north boundary is making steady pro-

HIGHEST AND LOWEST BAROMETER.									
Feb. 13	Feb. 14	Feb. 15	Feb. 16	Feb. 17	Feb. 18	Feb. 19			
30.01	29.09	29.97	29.08	29.97	29.93	30.01			
29.53	29.52	29.85	29.83	29.85	29.70	29.26			
MINIMUM AND MAXIMUM THERMOMETER.									
57	55	56	65	62	60	57			
50	50	46	52	57	55	50			
MEAN DAILY HUMIDITY.									
00	80	70	80	84	83	63			
PREVAILING WIND.									
W	SE	SE	SE	SE	SE	NW			
WIND—MILES TRAVELED.									
410	322	90	123	334	230	330			
STATE OF WEATHER.									
Fair.	Rainy	Clo'dy	Rainy	Rainy.	Rainy.	Clo'dy.			
RAINFALL IN TWENTY-FOUR HOURS.									
.61	1.02		.42	.92	1.25	.39			
Total rain during the season, from July 1, 1877, 26.53 in.									

THE ENGINEER.

A New Way Across the Continent.

The latest scheme for crossing the continent by rail seems to leave California and Oregon wholly out in the cold, and proposes to strike across from Norfolk, Virginia, to Topolavampo, on the west coast of Mexico, at latitude 25° 32' N. The advantages of such a route are painted in glowing colors, and it will be interesting to read the accounts, just to see how well the world can do without us. The accounts say that Topolavampo, or Topolobampo, occupies geographically the apex of the great commercial V of the North American continent; that is to say, that each and every port on the coast of the Atlantic ocean and the Gulf of Mexico, from Halifax, Nova Scotia, to Brazos de Santiago, and that each and every great center of industry and population in Canada, Nova Scotia, New Brunswick, and the United States, east of the Rocky mountains, the great lakes and the valley of the St. Lawrence, is nearer, and has less interruptions from topographic barriers and climatic extremes to Topolavampo than to San Diego, San Francisco or Puget sound. Data in support of these statements have been published in an official pamphlet (War Department). The demonstrations showing the advantages in distance cannot be refuted successfully, if the principles of Euclid are not in error. St. Louis, Mo., is 316 miles, and Chicago 221 miles nearer, as the crow flies, to Topolavampo than to San Francisco. Omaha, Neb., is 150 miles nearer to Topolavampo than to San Francisco, and Fort Worth, Texas, is over 400 miles nearer than to San Diego, and nearly 800 miles nearer than to San Francisco. New York is 340 miles, and Philadelphia 350 miles nearer to Topolavampo than to San Francisco.

While the Austin-Topolavampo indisputably will give a less track, and a less "equated" distance from all ports on the Eastern coast, and from all metropolitan centers in the Atlantic sections of our continent, it will also have a superior claim upon the through travel and traffic between Europe and Asia. In glancing at the Pacific, it is seen that San Francisco stands within 4,760 miles of Japan, yet vessels steam from her ports, 5,250 miles, so as to have the advantages of the upper edge of the trade-winds and currents which sweep towards Asia on and below the 30th parallel of north latitude. A steamer or sailing vessel from Magdalena bay, or from Cape St. Lucas, has stronger winds and currents for the Sandwich Islands, and all ports in Japan and China than from either San Francisco or San Diego—sufficient, it is believed, to almost overcome the disadvantages—the direct distances. The advantages a rail line would have from Norfolk to Topolavampo, over the route from New York to San Francisco, is 1,014 miles, and over that from New York to San Diego 651 miles. When the equated distances of the transcontinental lines are established and compared, the Norfolk-Topolavampo route will appear, it is thought, to still greater advantage.

Working of the Erie Canal.

Our Eastern exchanges say that Auditor Schuyler, of the canal department, will be compelled to report to the Legislature that the revenue from the canals this year is less than last, despite the lowering of the tolls on the chief articles transported, a policy of action which, it was asserted, would increase the canal income of the State. The tolls in 1876 brought in \$1,340,003, and in 1877 only \$880,866, or \$459,137 less; but the total number of tons carried has considerably increased. Western commerce has indeed been, in a measure, attracted back to the canals, as the advocates of low tolls claimed it would be. Thus, only 416,376 tons of wheat were transported in 1876, while in 1877 there were 445,846 tons. There was a corresponding rate of increase in the amount of other articles carried. Corn to the amount of 365,254 tons was transported in 1876, whereas in 1877 its bulk increased to 722,864 tons. There were 96,494 tons of harley carried in 1876; in 1877 there were 140,358. Also there were 759,374 tons of anthracite coal transported in 1876; in 1877 there were 975,028 tons. Altogether there were transported in 1876 materials weighing 4,172,129 tons; in 1877 materials weighing 4,879,013 tons, an increase for that year of 706,884 tons. To conclude, the gain in tonnage by lowering the tolls is about 17%. The loss in receipts from tolls is about 34%.

New York Elevated Railway.

This project for rapid transit in the city of New York now bids fair to be quickly realized. According to the *Iron Age*, the various establishments for the manufacture of ironwork under the recent contracts, are employing their entire force so that no default may occur. The Messrs. Whitney and Cornell together have a formidable job. All the large irons called for in their agreement will be made by the Pencoyd and Phoenix Iron Companies of Philadelphia. The former think they can increase their production so as to erect 20 spans per day, in addition to other work, the iron to be delivered at once. This week the work of erection will commence, beginning at Sixth street and Third avenue, and as regards the style of construction, the railroad company have decided to have a double track joined by transverse girders, mak-

ing it truly substantial. The united firms just mentioned take the road from the intersection of the Bowery and Third avenue to 61st street, on the east side, and from 53d street and Ninth avenue on the west side to 61st street, with a branch line from Third avenue through 42d street to the Grand Central Depot. The expectation is to have the entire work completed to Harlem river before the summer is ended. To erect 20 spans a day, as proposed, requires 140 tons of iron, from which fact some idea can be formed of the greatness of the undertaking.

Improving the Tennessee River.

We have alluded to this subject before. The movements are being pushed, and the *Iron Age* says that a committee of gentlemen composed of prominent manufacturers, merchants, professional men, agriculturists and operators of mines last week presented to the House Committee on Commerce at Washington, a memorial proposed by direction of the River Improvement Convention, which met at Chattanooga on the 5th of December last. The committee are drawn from Tennessee, Alabama, Georgia and North Carolina, and all vitally interested in the development of the great valley of the Tennessee and its tributaries and dependencies. The memorial recites, first, the size of the river, showing it to be of equal length and volume with the Ohio; second, its importance is demonstrated by the latent and visible resources which lie in its valley and the valleys of its tributaries; and, third, the nature of the main impediment to its navigation is discussed.

The average depth of the Tennessee river from its mouth to the obstructions, a distance of 296 miles, is fully three feet the year round. From Knoxville to the shoals, a distance of 551 miles, the average depth of the river is fully two and one half feet. Boats drawing four and five feet ply the year round from the foot of the shoals to the mouth. Boats of two and three feet draft run most of the year from the head of the shoals to Knoxville. Above the shoals, Little Tennessee, Clinch, Powells, French, Broad and Hiwassee rivers furnish 395 miles of available tributary navigation during about five months of the year. The nature of the shoals and the detailed operations of the engineers at that point, have already been pretty fully set forth in our columns. Major W. R. King, United States Engineer in charge of the improvement, says: "The estimate for improving Muscle Shoals, as submitted by Major Walter McFarland, in his report of 1873, was \$4,003,000; of which amount there has been appropriated at various times, \$1,035,000; of this latter sum about \$454,000 have been expended upon Muscle Shoals and \$260,000 at other points on the river, leaving a balance of \$321,000 to pay for work under existing contracts. The sum still to be appropriated is therefore \$3,228,000. Probably not two-thirds of this amount will be required, in consequence of reductions made and to be made, as already explained."

SIBERIAN TELEGRAPH LINES.—The *North China Herald* hears of the arrival from Japan of three Danish gentlemen, Capt. W. de Hede-mann, Mr. Nielsen, telegraph engineer, and Mr. Falck, inspector of telegraphs, who have made their journey overland from St. Petersburg to Vladivostok. They formed part of a mixed commission, sent out by the Russian government, in conjunction with the Great Northern Telegraph Company, to inspect thoroughly the land lines through Siberia, and they were accompanied by three high functionaries of the Russian Telegraph Department. The commission set out, on January 30th, from St. Petersburg, and arrived at Vladivostok on September 17th, having traveled about 6,700 miles. Owing to heavy inundations, the commissioners encountered great difficulties on the voyage between Kharharoika and Vladivostok, and had sometimes to travel by boats and sometimes on foot, the roads being impassable on horseback. When the labors of the commission are reported at headquarters and the proposed ameliorations can be carried out, it is expected the lines through Siberia will be put in a thoroughly efficient state and the usual interruptions in spring and autumn be avoided.

THE CAPE COD CANAL.—This canal, considered for about 200 years, as a necessity, appears to come up this year with greater force than ever, and there is a possibility that something may be done. If it was some railroad improvement in the West, we suppose New England capitalists would not hesitate one moment, and put out their money with the greatest liberality, but as it is an improvement near at home, one that would facilitate and improve the commerce of the port, they will hesitate. The voyage around Cape Cod has been the terror of our mercantile marine, and more property has been destroyed year after year than would build ten such canals as is proposed. It will not only lessen the risks but shorten the passage to Southern ports, Cuba, South America, and if the canal is completed it would be used by the New York steamers to and from Europe. The necessity of this canal will be seen from the fact, that the custom house records made some years ago, when this project was favorably considered and a charter granted, say from 1843 to 1869, 27 years, there were 1,444 wrecks on Cape Cod.

A SNOW-SLIDE in Big Cottonwood, Utah, carried away the tramway and one house of the Reed and Benson mine. No person was injured.

New Views of the Spheroidal State.

Prof. Barratt gave on the 3d of January, at the London Institution, a lecture on "New Views of the Spheroidal State." He first reminded the audience, as reported by *Iron*, what the condition was which is expressed by the words "spheroidal state." When we allow water to fall on a warm surface, such as the hob of a grate, it rapidly evaporates without noise. If the surface be nearly red hot, the water instantly and noisily hisses into steam. Reasoning onwards from these facts, we should conclude that if the surface be intensely hot—at a white heat, for example, the water would flash into vapor, and disappear the moment it touched the iron. But this is not so; and it is often here we are met with one of those anomalies that so often arrest us, and show the need of putting *a priori* conclusions to the test of actual experiment. The anomaly in this case is this: Water, or any other liquid, falling on a red hot surface, does not flash into steam, but rolls about on the glowing surface in liquid drops comparatively cool. They are not perfectly spherical, owing to gravity, but this is their anomalous deportment which has been termed the spheroidal state of liquids. So far back as 1746, Eller studied the phenomena, and Leidenfrost, a German philosopher, in 1797, published an elaborate dissertation on the subject. He, and after him Klapproth, proved that the drops were below the boiling point of the liquid used, and their explanation of the phenomena is that which has been generally accepted to the present time. Their explanation was this: By its first contact with the hot surface, part of the liquid is suddenly turned into vapor. This vapor has a definite and considerable tension or pressure. The pressure thus generated acts in opposition to gravity, for it tends to push back the atmosphere above, and with it the liquid drop. It would soon be equalized, and the drop would no longer be sustained, were it not that the proximity of the hot surface constantly generates more vapor and thus renews the upward pressure. Hence the drop is buoyed up by a shield of its own vapor on which it rests as a mobile elastic spring. The contractile force which exists on the surface of all liquids tends to draw the particles of the liquid into the smallest compass, and by what is known as the superficial tension of the liquid, the drop freed from the adhesion of the solid gathers into a little spheroidal drop. This has been the state of our knowledge up to the present time. Among the experiments which were used in illustration of this part of the lecture, it was shown very successfully by an enlarged image on the screen that a space really did exist between the drop and the heated metal on which it rested. Many allusions to the fiery ordeal and to more modern handling of heated metals were made, which are explicable in consequence of the knowledge that with a fluid on the skin highly heated metal cannot touch it. M. Boutigny, some 20 years ago, showed that even nitric acid on a copper dish, when thrown by heat into a spheroidal state, would not touch the copper. But there are cases in which the old explanation cannot hold good. For example, in some states of the weather, the water splashed up in rowing will be noticed falling back and rolling in spheroidal drops. So, too, spirits of wine and petroleum may be agitated by vibrations from a how drawn across a glass that contains them till they throw up globules which roll about on the surface. It is here, Prof. Barratt said, that Mr. Johnstone Stoney's investigations on the forces which produce the motion in the little vases of Mr. Crookes' radiometer come into consideration. To Mr. Stoney, he said, is unquestionably due the great honor of having been the first fully to explain the true theory of the radiometer. It was in the course of these investigations that Mr. Stoney had quite recently been led to show that the force which is so active in the high rarefaction (that is necessary for the effective rotation of the radiometer) is also present at ordinary atmospheric tensions. Now, it is this force which forms the new explanation of the entire phenomenon of the spheroidal state. Prof. Barratt proposed to call it "Stoney's force." In order to understand the action that occurs it must be recollected that, according to calculations, the number of molecules of air that at ordinary pressure occupies the space of a pin's head is 1,000,000,000,000,000,000; when the radiometer globe is exhausted of these molecules of air, as far as we can do it by mechanical means, there are still some few millions remaining, and these are in constant motion. Heat makes them move more rapidly, cold more slowly. If we have two surfaces very near each other, one surface hot and the other cold, from the hot surface the molecules will be thrown off with greater rapidity than they reached it; and if the cold surface be near enough, they will "homhard" it. Hence there will be a tendency in the hot and cold surfaces to retreat from one another, and when with one of these, as in the radiometer, this is possible, it ensues.

TELEPHONES will soon be within the reach of all. At no distant day every family will have one of its own. True, you can't get a good one in this country now for much less than \$50, but they are selling in London at \$8 apiece, with a downward tendency in the price.

THE SUTRO tunnel is gradually nearing the Comstock, and the blasts in the header can now be distinctly heard by the miners at work on the 2,000-foot level of the Savage and Hale & Norcross shafts.

Eastern Mining Camps.

Frank Wheeler and Hank Blanchard returned from a trip of 14 days duration among the mining towns and camps of the eastern part of the State. They traveled in a two-horse carriage, and had a good time wherever they went. They found the roads good in all directions, and their team and carriage came back as good as when they set out, though while away they traveled a distance of about 500 miles.

Aurora

The first camp visited, is highly spoken of. The town has taken a new lease of life, and improvements are going on in all directions. Many mines formerly abandoned are now being vigorously prospected, and great activity will be seen in all that region next spring. The new shaft of the Real del Monte mine, under the superintendence of George Daly, formerly of this city, is now down 85 feet. It is not expected that the shaft will cut the lode until it has been sunk to a depth of over 1,000 feet, as it is being sunk some 600 feet from the vein.

Bodie

Is a wide-awake place, and much mining and prospecting is being done. All there, are in fine spirits, and the town is rising like the Phoenix from the dust and abomination of its former desolation. Our travelers are unanimously of the opinion that it will be one of the biggest and liveliest of the new camps next spring.

Mason's Valley

Is highly spoken of as an agricultural district. The ranchmen had fine crops last year, and this year expect no less. They have an excellent market at home for all they raise, selling everything at prices much higher than those that rule here. All is in a flourishing condition at the Walker Lake Indian Reservation, and the Indians are happy and content under the rule of their agent, Mr. Holland.

At Lodi

Uncle Billy Raymond, the discoverer of the Raymond & Ely mine, Pioche, has the big mine of the country. He purchased his mine for \$60,000, and out of 700 tons of ore shipped to Sacramento cleared enough to pay for the whole mine. He now has out from 1,200 to 1,500 tons of first-class ore that will pay \$200 per ton, and about 1,000 tons that will pay \$100. He has his own furnace. This is the invention of a Mr. Gerrish, a copper smelter, and is a grand success. They refine their lullion at the mine, as they want the lead to use in their furnace, there not being a sufficient amount in the ore to smelt well.

The West Gate Mine.

At West Gate Station, is being vigorously prospected, and promises to become a first-class smelting mine. The shaft is down 100 feet, at which point they have cut across the lead, and find it to be 46 feet in width, with the mineral much more concentrated than on the surface, where it was about 70 feet in width. By next spring they expect to be taking out ore for smelting.

Both gentlemen are well pleased with what they saw in all the places visited, and come back with a high opinion of the future of the eastern part of the State. — *Virginia Enterprise*.

THE BACKWARD HABIT OF THE JAPANESE.

The Japanese habit of reversing everything, if we may regard our own way of doing as the proper way, is very curious, and in some of its details, very interesting. Mr. Griffiths, in his work on Japan, discusses it thus: "Another man is planing. He pulls the plane towards him. I notice a blacksmith at work. He pulls the bellows with his feet, while he is holding and hammering with both hands. He has several irons in the fire, and keeps his dinner-pot boiling with the waste flame. His whole family like the generations before him, seem to get their living in the hardware line. The cooper holds his tubs with his toes. All of them sit down while they work. Perhaps that is an important difference between a European and an Asiatic. One sits down to his work, the other stands up to it. Why is it that we do things contrarywise to the Japanese? Are we upside down, or they? The Japanese say that we are reversed. They call our penmanship 'crab-writing,' because, say they, 'it goes backward.' The lines in our books cross the page like a crawfish, instead of going downward properly. In a Japanese stable we find the horse's flank where we look for his head. Japanese screws screw the other way. Their locks thrust to the left, ours to the right. The baby toys of the Aryan race squeak when they squeezed; the Turnonian gimcracks emit noise when pulled apart. A Caucasian, to injure his enemy, kills him; a Japanese kills himself to spite his foe. Which race is left-handed? Which has the negative? Which the positive of truth? What is truth? What is down? What is up?"

THE Titusville, Penn., *Herald*, says: "A wealthy operator located eight dry wells last year. He is an 'oil smeller,' and oostly experience will probably never rid his mind of the delusion that a hermetically-sealed bottle held by a string near the ground will indicate the existence of petroleum 1,000 or 1,500 feet below the surface. It is a species of mumbo-jumbo business that found favor in the early days of the oil excitement, and a few respectable and intelligent natives were fascinated by the craze and have never recovered from the affliction. The gentleman spoken of has more than \$100,000 worth of dry holes to remind him of his foolishness."

Source of Water in the Mines.

A notable feature of the great porphyry bed in which rests the Comstock system of quartz lodes is its vast longitude from north to south. This remarkable zone of metamorphic rock has been clearly traced from Pyramid district on the north, to a point east of Empire city on the south, and in fact, there are vestiges of it south-east of Genoa. The general trend or strike of the mineral-bearing quartz lodes through the great porphyry belt is nearly north and south, but there are numberless curves and deflections in the system which give to each mining locality a sort of isolated quartz crescent, such as appears in the mother lode at Gold Hill and Virginia. These bendings and distortions were doubtless occasioned by lateral volcanic disturbances, long after the deep fissures were formed and filled with quartz and minerals. In addition to the manifest disturbances outside of the porphyry zone, the lodes were, probably in the miocene period, bent, crushed and distorted by eruptive dykes of trachyte and andesite, which came up in various portions of the metamorphic bed. One of these eruptive dykes followed the sloping base of Mount Davidson and Butler, and came out on the western flank of the porphyry mass, while another, of greater magnitude, was extruded further toward the east. These eruptive dykes are now plainly traceable, and afford a ready clue not only to local disturbances and faults in the quartz veins, but they also account for the remarkable crushed condition of the once solid ore chambers. Every Comstock miner is aware that most of the quartz veins here are literally crushed to atoms before extraction, and instead of the quartz retaining its original compact, flinty texture, it is little else than a mass of friable pick-rock. To this peculiar crushed condition of the Comstock quartz veins may be attributed the vast inflow of water which has so long baffled the skill and energy of mine-owners. For many ages water from the surface has been constantly percolating through the fractured rocks, penetrating and saturating the crushed material of the ledges, until the entire fissure, for many leagues in longitude, became a vast reservoir of water. As the great porphyry bed in this locality is firmly walled on the east by an unbroken wall of trachyte, and on the west by the solid base of Mount Davidson and Mount Butler, it is not reasonable to suppose that a supply of water could reach the Comstock from either Washoe valley, the Steamboat springs or the Carson river. The supply evidently comes from the lode itself, and this fact encourages us to believe that constant pumping will ultimately exhaust the aqueous annoyance. It may be urged against the theory here advanced, that there was a depth of more than a thousand feet in the Comstock where the lode was almost entirely devoid of water. In answer to this, we have only to refer to the vast longitudinal extent of the great zone. Even if surface percolation did not occur in this immediate section of the system, water may have entered the fissure at other points many miles away, and in the lapse of centuries gradually saturated and filled the entire mass of crushed and distorted minerals in the great fissure.—*Virginia Enterprise*.

Dull Times and their Cause.

During the week the two prominent mining companies will pay off their workmen, and settle charcoal and other supply bills. The aggregate amount to be put in circulation will reach \$250,000. This sum has been regularly expended for the last six months, and one would naturally suppose that coin ought to be tolerably plentiful on the Base Range. Such is not the case, however, and we doubt if there was a greater stringency in the money market during the period when the principal mines were closed down. If the dullness only pervaded the saloons, we should ascribe the cause to a change in the habits of the workmen, and the advent of a different and eteader element; but this solution of the problem is not the correct one, from the fact that merchants and business men complain as bitterly as the saloon keepers. The true reason must be sought elsewhere, and can be easily found in the all prevailing mania for stock gambling. Without preaching any worn-out homilies on the subject, we can safely assert that it is the one serious drawback to our prosperity, and that the indulgence in the passion drains every surplus dollar out of the town. Unfortunately the speculation is not confined, nor, in fact, does it affect our own mines, the Comstock and outside gambles getting away with the specie. As proof of this we could mention instances by the score—the Day mine, for example: When shares in that property dropped to \$3.50, a sure point was whispered about; there was going to be a deal; \$10 was the figure named, and 3,000 shares were taken in at the selling price. The buyers were taken in also. It dealt down below a dollar, and the insiders must be huffing yet; at any rate, the deal has not yet arrived. Tuscarora's stocks were another favorite investment, and Eureka contributed her share to the wild cats of that region, while the capacious maw of the Comstock surfeited itself on our bullion product. We are not whining over the situation, but only pointing out cause and effect. If that mythical rise ever does come, and the stock market experiences one of its old time upheavals, there will be more rich men to the acre on the Base Range than any other section of this glorious republic. In the meantime, one need not go further than the above explanation to find the true cause of the prevailing hard times.—*Eureka Sentinel*.

USEFUL INFORMATION.

Iron as a Tanning Agent.

According to the *Baltimore News*, Prof. Dr. Kapp, of Brunswick, has succeeded in inventing a process for the tanning of hides which has produced a complete revolution in tanning, and will, perhaps, be of considerable importance in a politico-economical point of view. The new process does away entirely with the application of tan and consists simply in tanning by minerals which substitute a substance far less costly than tan, growing daily more rare, and saves considerable time and labor. Moreover, the process has been practically carried on for some time and sufficient, too, to establish its practical value, which, according to the present condition of things, is beyond all doubt.

Dr. Kapp's invention consists of three parts—first, the process of producing the material applied by this new mode of tanning; second, the process itself, and third, an apparatus for that purpose. To cure the leather, Dr. Kapp employs basic sulphate oxide of iron, prepared in a peculiar manner, totally different both in appearance and its other qualities from the salt of iron known by a similar name in commerce. To produce that salt he adds the necessary quantity of nitric acid to a boiling solution of the vitriol of iron. The development of gas having stopped and the oxide of iron being formed, more vitriol liquid, which, when evaporated, yields dry salt of the oxide of iron, a clear, deep, orange-colored varnish.

To cure the hides they are hung in the duly concentrated solution of the salt of iron, now cold, and they are now sufficiently cured, according to the thickness of the hide, in from two to four days, without being obliged to move, transfer or subject to any other of the mean processes.

With the preparation now ensuing it is not necessary to grease the hides nor hang them in a dry room, or tramp them in a vat or scrape off the grease by hand or work in the grain by hand. Of all the operations formerly in use none are retained in this process but to shave and perch them. The manual labor is replaced by making a solution of the greasing material in which the hides are steeped, while they are being dried and tramped at the same time.

The fats used to grease the leather are dissolved in the usual manner, and the hides are steeped into it. Beside the ordinary grease, you may apply stearine and paraffine, never before applied for that purpose. The dissolved grease combines with the solution of iron on the fibers of the hide to a soap of iron to be rubbed into the leather by a peculiarly constructed drum. This drum consists of one of those tramping vats, revolving round hollow plugs, which by means of these same plugs is fastened to a ventilator. Turning that drum the ventilator is set in motion at the same time, which during the tramping is made to ventilate the hides, being tramped and dried at the same time. Evidently the process is very simple, requires but little time, and much cheaper than the modes now in vogue. As said before, Kapp's process has fully stood the test, and will, ere long, entirely displace the old mode of tanning.

Dr. Fol, Director of the Experimental Institute for Leather Industry, in the "Industrial Papere," speaks very favorably of Kapp's process of curing leather by iron, for the first time represented at the Berlin Leather Exposition. The tanning with iron works substantially like that with alum, equal to tan materials, penetrate the hide, holding the fibers apart so they do not re-adhere. Alum, however, is dissolved in water and is washed out by it. Tanned leather is softened by rain, just like a hide, and stiffens when dry. Iron is washed out in the same way. Prof. Kapp has removed that difficulty, applying a soap of iron to the leather, by means of which the salts of iron are made insoluble and stay in the leather. Dr. Fol had boots made of that kind of leather, now worn by him, which are still pliable in spite of long usage. At the exposition named some shoes were made of iron-cured leather by the machines there exhibited.

AN ADULTERATION OF ESSENCE CLOVES.—E. JACQUEMIN—Attention is called to the use of phenol for this purpose, and for its detection a small drop of aniline mixed with 5 or 6 c. c. of distilled water is recommended; this is added to the essence, then several drops of hypochlorite of soda. If phenol is absent, the color furnished by aniline alone is obtained a slight violet-purple, which is transitory; if present, a beautiful blue color is produced, which lasts for several minutes; one per cent may be detected.

AROMA OF BUTTER.—A Silesian farmer suspends in his empty churn a calico bag, filled with fragrant herbs, keeping the churn carefully closed. At churning time he substitutes four smaller bags, attaching one to each of the heaters of the churn. He thus communicates to the butter an aroma as delicate as if the cows had pastured in meadows most highly favored by nature.

PASTE BLACKING.—Paste blacking is made by mixing powdered bone-black with half its weight of molasses, and one-eighth its weight of olive oil, and to this is afterwards added one-eighth of its weight of hydrochloric acid, and one-fourth of its weight of strong sulphuric acid; the whole is to be then mixed up with water into a yielding paste.

A CHEAP TELEPHONE.—Prof. Barrett, in a recent lecture on the telephone, gave a receipt for making a cheap one. Take a wooden tooth-powder box and make a hole about the size of a half-crown in the lid and the bottom. Take a disc of tinned iron, such as can be had from a preserved meat tin, and place it on the outside of the bottom of the box, and fix the cover on the other side of it. Then take a small bar-magnet, place on one end a small cotton or silk reel, and round the reel wind some iron wire, leaving the ends loose. Fix one end of the magnet near, as near as possible without touching, to the disc, and then one part of the telephone is complete. A similar arrangement is needed for the other end. The two are connected by the wire, and with this Prof. Barrett says he has been able to converse at a distance of about 100 yards.

A SELF-WINDING CLOCK.—A German has invented a clock in which the winding machinery is operated by the alternate expansion and contraction of glycerine or other suitable liquid. A piston, on the surface of the glycerine, is so connected with ratchet wheels and toothed racks, that motion in either direction will wind up the weight. The inventor thinks that the contrivance will be especially valuable for self-registering meteorological instruments.

PRINTING PICTURES FROM PRINTS.—The page or picture is first soaked in a solution of potash and then in one of tartaric acid. This produces a perfect diffusion of crystals of bitartrate of potash through the texture of the imprinted part of the paper. As this salt resists oil, the ink roller may now be passed over the surface, without transferring any ink except to the printed part.

BLACKED BRASS.—French optical instruments often have all their brass surfaces of a fine dead black color. The following is said to be the process used: Make a strong solution of nitrate of silver in one dish, and of nitrate of copper in another. Mix the two together and plunge the brass into it. Remove and heat the brass evenly until the required degree of dead blackness is obtained.

PRESERVATION OF LIME JUICE.—Lime or lemon juice may be preserved as follows: Heat the juice, to coagulate all albuminous matters, and then sweeten with pure glycerine. The glycerine will not only retard turgid growth, but prevent the juice from freezing even during the coldest winters.

SIMPLE TEST FOR PURITY OF CHLOROFORM.—The *Philadelphia Medical Times*, states that Dr. Leuke, of Strassburg, gives the following simple method of testing the purity of chloroform: "Immerse a small piece of thin white blotting-paper into the chloroform, and then let it dry in the air."

GOOD HEALTH.

Advances in Medical Science.

In reviewing the medical and surgical progress for the year 1877, the *London Lancet* notes the following: M. Paul Bert has published an extensive work on the effect of variations of pressure on the body, and he shows that the observed effects of diminished pressure are exclusively due to a diminution in the tension of the oxygen in the air, and consequent predisposition to asphyxia; while, on the contrary, increase of pressure up to three atmospheres occasions more active intraorganic changes, and when the pressure reaches five atmospheres the oxidizing processes either cease or become modified in such a way as to become inconsistent with the maintenance of life. Guttman, Frickler and Oertmann have demonstrated that the absorption of oxygen is independent of the mechanical act of respiration. Richet has determined that when perfectly fresh the gastric juice contains only minimal acids, but that after standing some time a kind of fermentation is set up in which free organic acid is formed that on analysis proved to be lactic acid. It is believed to be beyond doubt that lactic as well as butyric and acetic acids are often introduced either into the stomach or are formed in it as a product of fermentation.

The most important progress in the department of pathology is that toward the establishment and diffusion of the opinion that minute organisms are concerned in the progress of acute infectious diseases. Chateau has shown that the horse is peculiarly receptive of the vaccine virus, and is capable of reproducing it in remarkable purity and force.

CO-OPERATIVE SANITATION.—It is proposed by some of the most distinguished citizens of Edinburgh to apply the co-operative principle to scientific sanitary inspection. They are attempting to organize an association, the annual subscription of which will be one guinea, for the purpose of securing to its members, free of charge, that skilled sanitary supervision and advice which could only be got at enormous cost through individual action. The association is to secure the exclusive services of one or more well-educated young engineers, who, acting under the control of a consulting engineer of high standing, will, when required, inspect and report upon the dwellings of members, giving estimates as to the cost of any alterations that may be deemed advisable. Their recommenda-

tions must be limited to strictly indispensable points, and no officer of the association is to hold any pecuniary interest in any patent or manufacture. The Professor of Engineering in the University of Edinburgh has taken such a warm interest in this novel scheme that he has offered for the first year to give the association his gratuitous services. Another feature of the scheme is that each member, on payment of a trifling fee, may secure the services of the officials for any charitable society whose work in individual cases might be aided by them, or for any person in whom they are interested, who, though deserving, is too poor to obtain for himself good sanitary advice.

VALUABLE MOUTH WASHES.—The English periodical, *Dental Science*, commends the following recipes: A wash to harden the gums.—Take one-half pint Jamaica spirits, one-half teaspoonful each of powdered alum and saltpetre, pulverized, and one ounce of pulverized myrrh; mix. A favorite wash.—Take salts of tartar, one-half ounce; honey, four ounces; alcohol, two ounces; water, 10 ounces; oil of wintergreen and oil of roses, sufficient to flavor. For unhealthy gums.—Unhealthy gums are very common. A lotion made from the following recipes will be found valuable in restoring them to a healthy condition: Carbolic acid, 20 drops; spirits of wine, two drachms; distilled water, six ounces. Use first a soft toothbrush with water, after which pour on a second toothbrush, slightly dampened, a little of the above lotion. After using this for a short time the gums become less tender and the impurity of the breath, which is commonly caused by bad teeth, will be removed. A fine tooth paste.—The following is also from *Dental Science*: Take red coral, three ounces; cuttle-fish bone, one ounce; disulphide of quinine, one-half drachm; mix. Triturate to a very fine powder, add honey "white," four ounces, and a few drops of otto of roses, or neroli, dissolved in rectified spirits, three fluid drachms, and beat the whole to a paste. A little powdered myrrh, one to three drachms, is sometimes added.

RHEUMATISM.—This disease is a standing "conundrum" to medical men, but, says the *Journal of Chemistry*, Dr. Julius Polock thinks that he has at last cleared the subject of some confusion that surrounded it. He says that the term rheumatism is applied to several different diseases which are essentially distinct, although they have certain features in common. The two chief forms are articular and muscular rheumatism. The former is a disease of early adult life, more or less acute in character, with a tendency to get well in about six weeks. Articular rheumatism, when at all severe, is called rheumatic fever. It attacks the synovial membranes and also the similar serous membranes, especially of the heart. There is a distinct predisposition to this disease in certain persons, which is sometimes inherited. The immediate exciting cause is exposure to cold or "taking a chill." It never attacks the muscles. Muscular rheumatism is a disease of middle and advanced life, is commonly chronic, and will continue indefinitely if not treated. It attacks, not the muscles themselves, but the tendons and other parts of the muscle which have a similar anatomical structure. Muscular rheumatism does not attack the heart, and is rarely fatal.

PHILOSOPHY OF LIGHT DIGESTION.—In a dietetic point of view, it would be well for weak stomachs to remember that wild birds are more nutritious than their domesticated cousins, and more digestible. But the white breast or wing of a chicken is less heating than the flesh of winged game. Other game, such as venison, which is dark colored, and contains a large portion of fibrin, produces highly stimulating chyle, and consequently the digestion is an easy and rapid affair for the stomach. But, though the whiter meats may be detained longer in the stomach, furnish less stimulating chyle, and he suffered to run into acetous fermentation, their lesser stimulating quality may recommend them when the general system is not in want of a spur. Meats are wholesome, or otherwise, less with reference to themselves than to the consumer: "To assert a thing to be wholesome," says Van Swieten, "without a knowledge of the condition of the person for whom it is intended, is like a sailor pronouncing the wind to be fair, without knowing to what port the vessel is bound."—*Dr. Doran*.

WATER FOR THE EYES.—A writer in *Fraser's Magazine* thinks that, whatever hesitation there may be justly called for in recommending one or another of the various lotions now so popular, there need be no such doubt in respect to cold water or pure water. He says in cases of much inflammation or difficulty of opening the eyelids in the morning, experienced by so many, the water should be warm, and it may be mixed with warm milk, but in nearly all other cases it should be cold. All those who have been engaged in reading or writing during several hours at a stretch, and especially at night, should carefully bathe the eyes with cold water before going to bed and the first thing in the morning's ablutions. All artisans, too, who work at a blazing fire, ought often to wash their eyes with pure cold water, and so should all those who work in wool, particularly carders and spinners, and those likewise who are employed in woolen and cotton manufactures, the fine dust which such works disperse often producing catarrhs, obetinate inflammations, swelled eyelids, etc.



W. B. EWER.....SENIOR EDITOR.

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SAN FRANCISCO:

Saturday Morning, Feb. 23, 1878.

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The Week.

The principal topics of the week have been the passage of the Silver bill by the United States Senate, and the downpour of rain and consequent floods in some parts of the State. Concerning the Silver bill, we give a portion of Senator Jones' speech, which is worthy the perusal of all our readers, giving as it does so complimentary a record of the miners of this coast, written by a man who was once one of them himself. Although now a rich man and U. S. Senator, Mr. Jones has worked with pick and shovel in the mines, and knows whereof he speaks.

As we write, on Thursday, the skies are clear and the winds have ceased for a time. The cold weather and the cessation of rains will probably cause the floods to subside.

A FIRE in New York on Sunday, destroyed two churches and from \$500,000 to \$1,000,000 of property. The Excelsior block, costing \$400,000, was destroyed.

Product of Leading Mines in 1877.

In our annual mining review, published in January, we gave a brief history of this mining interests of the coast for 1877, and also the tables showing the bullion production. We are now able to lay before our readers a summary showing the bullion production of the leading mines during the year 1877, the information in most cases having been obtained from official sources.

In the department of hydraulic mining, comparatively little is done on this coast outside of California. As the production of these mines is largely dependent on the water supply, it suffered serious curtailment last year in consequence of the prevailing drouth. With the prospect of abundant water and other favorable conditions, the yield from this source will probably be increased the present year to the extent of 25% or 30% at least, and it is not likely that it will again fall as low as it was last season for many years to come. At present the outlook for this branch of mining is very encouraging.

As the most of the water readily available for hydraulic mining has been appropriated, more attention is being paid every year to drift operations, the field for which is almost without limit in this State, many tunnels designed for opening up this class of deposits having been started within the past year or two. As yet the most extensive drift claims are those mentioned below, but it will not be long before the list of important mines of this class is greatly extended.

Quartz mining in California is also believed to be on the eve of a marked expansion, and there is not the least doubt but Arizona will turn out twice as much bullion this year as she did last. There are many mines in this Territory capable of yielding considerable bullion, if they were only furnished with reduction works, a want that will to some extent be supplied the current year. There is good reason for believing that Nevada and Utah will also make more bullion this year than last. We have no means of obtaining the yield of individual mines in Montana, Oregon, Idaho, or, in fact, anywhere, unless their offices are in this city. There are many close corporations, which, for reasons of their own, refuse to make public any figures of their yield. The list we have prepared makes no pretense of being at all complete, but comprises the principal mines of the locations mentioned. The figures, in most cases, have been obtained from the officers of these companies in this city:

California Hydraulic Mines.

North Bloomfield, Nevada county.....	\$ 291,125.40
French Corral, Nevada county.....	223,003.30
Manzanita, Nevada county.....	165,713.10
Eureka Lake & Yuba canal company, Nevada county.....	230,000.00
Blue Tent, Nevada county.....	104,110.13
Scott's Flat, Quaker Hill, You Bet, etc., Nevada county.....	450,000.00
Little York, Lowell Hill, etc., Nevada county.....	375,000.00
Mines at Dutch Flat and Gold Run, Placer county.....	700,000.00
Mines on Forest Hill Divide, Placer county.....	300,000.00
El Dorado W. & D. G. M. Co., El Dorado county.....	78,681.10
Amador, Calaveras and Tuolumne counties.....	1,000,000.00
La Grange, Stanislaus county.....	101,055.79
Sierra and Plumas counties.....	600,000.00
South Feather river, Yuba county.....	50,316.78
Excelsior, Yuba county.....	450,000.00
Spring Valley, Butte county.....	335,000.00
Other hydraulic mines, Butte county.....	150,000.00
Shasta, Trinity and Siskiyou counties.....	500,000.00

DRIFT MINES.

Golden Gate, Placer county.....	\$ 175,000.00
Bald Mountain, Sierra county.....	400,000.00
Empire, Sierra county.....	205,500.00
Enterprise, Sierra county.....	275,000.00
Buckeye, Plumas county.....	180,000.00

QUARTZ MINES.

Gwin, Calaveras county.....	\$ 300,000.00
Hite, Mariposa county.....	212,400.00
Standard (Since April 10), Mono county.....	707,451.31
Idaho, Nevada county.....	530,143.69
Eureka, Nevada county.....	50,000.00
Empire, Nevada county.....	177,800.00
Modoc Con., Inyo county.....	631,312.62
New Coso, Inyo county.....	455,400.00
Sierra Buttes, Sierra county.....	235,000.00
Plumas Eureka, Plumas county.....	429,500.00
Black Bear, Siskiyou county.....	240,500.00
Klamath, Siskiyou county.....	80,000.00

Nevada.

Consolidated Virginia, Comstock.....	\$13,734,100.00
California, Comstock.....	13,924,000.00
Ophir, Comstock.....	182,834.27
Justice, Comstock.....	2,248,700.00
Belcher, Comstock.....	418,300.00
Chollar, Comstock.....	511,639.33
Crown Point (Since Oct. 1), Comstock.....	77,100.00
Rye Patch, Humboldt county.....	167,800.00
Northern Belle, Esmeralda county.....	1,454,680.56
Endowment (Since Aug. 1), Esmeralda Co.....	72,000.00
Manhattan, Lander county.....	945,400.00
Tybo Con., Inyo county.....	840,000.00
Richmond Con., Eureka county.....	1,350,000.00
Eureka Con., Eureka county.....	1,550,000.00
K K Con., Eureka county.....	508,700.00
Star (Since Nov. 1), White Pine county.....	35,000.00
Martin White (Part of year), White Pine county.....	311,700.00
Raymond & Elko White Pine county.....	301,572.00
Alps (Since Sept. 1), White Pine county.....	88,800.00
Leopard, Elko county.....	246,200.00
Grand Prize, Elko county.....	335,500.00
Mines of Lincoln county.....	600,000.00

Utah.

Leeds, Washington county.....	\$327,700.00
Ontario, Summit county.....	1,758,800.00

Arizona.

Silver King (Since May).....	210,000.00
McCrankin.....	200,300.00
Hackberry.....	150,000.00

As before stated, this list is by no means complete, although it comprises all those mines with offices in this city, where the information desired was given. There are numbers of others which have made a small product, which we have not mentioned. In the case of some of the gravel mines, we have, from partial returns, estimated the balance of the mines in the vicinity.

The Silver Bill.

Senator Jones' Great Speech on the Subject.

The Silver bill, which we give in full in another column, has passed the Senate and, in all probability, will pass the House. The feature of this debate on the question was the speech of Senator Jones, of Nevada, who went into the subject most exhaustively. In this speech, which has been very much commended even by the opponents of the bill, Senator Jones paid a glowing tribute to the mines, to whom the country is indebted for the financial structure on which it rests. We condense the following from Senator Jones' remarks:

It has been persistently urged that if silver has not yet depreciated, its tendencies are in that direction, and that if we remonetize it, we shall be overwhelmed by the discarded refuse stock of other nations, and that this country will be cursed with fluctuating, depreciated, unreliable and worthless money. Look to whatever quarter we may for the source of this threatened flood, it cannot be found. France has none to spare. The \$300,000,000 of silver she has is all urgently needed as a basis for her paper issues. She can only discard it by supplying its place with gold. If she enters upon this experiment now or in the near future, it would postpone indefinitely any attempt at gold redemption in this country. Our legislation must therefore be based on the idea that France must continue her present money system indefinitely. Reliable information from Germany shows that the disposable stock in that country does not now exceed \$70,000,000. This amount might be emptied into three or four of the Western States without producing a flutter in the financial atmosphere. England, has not now and never keeps any considerable stock of silver on hand, but is constantly obliged, in order to meet the demands of her commerce with India, to telegraph orders for silver on San Francisco. There are no Disposable Stocks Elsewhere, Either in Europe or America, and silver never returns from the Eastern world. Whenever the prediction has been made that the markets were to be flooded with any other articles than silver—such as cotton or wheat—it has generally been deemed necessary, if the object was to affect the prices of production or the use of those articles, to point out specifically from what quarter of the globe the floods might be expected. But in respect to silver there has been a beating of gongs and a universal shout of warning to the people to maintain legislative dikes against the incoming floods of that metal whose source they have been unable, or unwilling to point out. This Chinese system of warfare against silver has proved ineffectual, because, upon examination, the masses of the people could not see that any evil would result to this country, even if the entire stock of German and French silver should be sent here. On the contrary

The People Believe

That a silver flood of only that magnitude could result in no injury whatever, but would only serve to revive the stagnant industry and commerce of the country. The Comstock lode, confessedly one of the greatest mineral-bearing veins ever discovered, and in the hands of the most vigorous, pushing, energetic, ingenious and enterprising people, has yielded less than \$200,000,000 of silver since its discovery 20 years ago. During that time exhaustive explorations have been made along its entire length to a depth of 2,000 feet. In view of facts like these, something more immediately threatening to the value of silver, and more plausible than a deluge of that metal from the distant mountains of Peru, was needed to frighten the people from restoring their ancient money standard.

The Rise of Gold.

I have so far considered the rise in the value of gold since 1872, as demonstrated and measured by the average fall in the price of commodities; but the rise in its value, as shown by the fall in prices of land and labor, has been vastly greater, and has contributed much more powerfully to the business prostration everywhere prevailing. Land and labor immeasurably overshadow in magnitude and importance the aggregate of mere merchandise that was ever in existence at any given period. Land in all civilized countries is the great basis and bulwark of credit, and a general or considerable fall in its price has never failed to be ruinous to every commercial and industrial interest. The inevitable consequences of a rise in the value of money, or, in other words, of generally falling prices, are

Stagnation of Industry.

Decreased amount of employment and shrunken wages. The luxuries of the rich and the comforts of the middle classes are at such times largely curtailed, and in many instances cut off altogether; but the wage classes, even when they earn more than the needs of subsistence, rarely indulge in superfluities or extravagances in living. For the purpose of getting ahead in the world, they pinch and save and live in the most frugal manner consistent with health and strength. Hence, during a period of falling prices, the demand for actual necessities is impaired the least, and the demand for things not in exigent requisition is impaired the most. A constantly increasing proportion of the aggregate earnings of labor and capital must be appropriated to the actual necessities of subsistence, and consequently the fall in their prices will be the least.

The Aggregate of Wages Will be Largely Reduced.

Because there will be no incentive to the employment of labor beyond that amount required to produce the necessities of life, and produce, also, such supply of comforts and luxuries as will suffice for the few who may still be able to indulge in them. The profits of both these kinds of production will be reduced to the lowest point consistent to their being maintained at all. It is easy to perceive that a long continued rise in the value of money and fall in general prices would destroy all credit, and that the resulting sufferings of the people would finally drive them to seek relief in a direct change of commodities. The prices of raw material which enters into all kinds of manufacture.

Falls in a Greater Ratio

Than do the necessities of life, because the manufactured article can be dispensed with, while the coarse food essential to the existence of the laborer is indispensable. The fall of prices is, of course, the greatest in those articles for which there is the greatest decrease in demand, and all experience shows that the depressing effect upon prices of property of an increasing value in money falls, first in point of time and greatest in degree, on luxuries, and the wage classes lose half their accustomed earnings through a reduction of their wages and more especially through unsteady employment and lack of employment altogether. This is not compensated by a corresponding fall in prices of what feeds them. On the other hand, such consumers of luxuries as are still able to command them, find a large offset to the diminution of their incomes in their very great fall in prices of what they buy. These obvious principles furnish an easy explanation of the present depressed condition of labor and real estates.

A Personal Explanation.

At the close of his argument, Jones, apologizing for the necessity of obtruding a personal matter upon the Senate, defended himself against the charge of advocating the rehabilitation of silver from unworthy and sinister motives. He was not insensible to the labored endeavor to disparage his action by the statement that he was an owner in the bonanza mines, and that his personal gains would be directly and immensely enhanced by silver remonetization. He denied that he ever had any considerable interest in those mines, and what he had has long been disposed of. He did own stock in one of the non-paying mines on the Comstock lode. This mine ceased to be productive more than three years ago, and a vast amount of money has been paid by stockholders to carry on the explorations continuously made since then. That it would ever become a productive mine is a matter of only distant hope. He had no investment in productive silver mines and his investments in non-productive silver mines are much less than in mines which produce gold exclusively. He advocated the remonetization of silver because justice and expediency demanded it, and because, even if it does not restore a full measure of prosperity, it will check the rapidly-spreading bankruptcy and poverty which threatened to overwhelm the country.

A Defence of the Bonanza Owners.

He also denounced the New York Press charge that the bonanza mine owners, or anybody else, had raised a fund to be corruptly used in prosecuting remonetization. Of the four gentlemen composing what is known as the Bonanza firm, he believed that the two who have personally devoted all the years of their manhood to gold and silver mining favor remonetization. The others, who always have been engaged in business pursuits and never practically engaged in mining, he believed were opposed to remonetization. Whatever their views, he believed them to be honestly entertained.

More Personal Explanations.

But while denying his personal interest in remonetization, he said: I wish to have it distinctly understood that I do not, even by implication, admit that my right to legislate on the subject would be lost, or in any way impaired, if the reverse were true. A fastidiousness of this delicate order would be more nice than wise. It has never been required of any one here except the alleged owners of silver mines. Has it ever been regarded as dishonorable for legislators who may have personal interests in iron, copper, lead and salt mines, in cotton factories or in any other manufacturing industry or in wool growing, to vote for or against tariffs and other laws directly affecting those interests? Has this gauzy virtue restrained the owners of stock in national banks from voting for laws directly benefiting those institutions? Has the metropolitan press demanded that persons so interested should abstain from voting here on such questions? If such a rule were insisted upon, might it not leave one or both branches of Congress without a quorum. Might not a strict enforcement of such rule render necessary the creation of an idle and privileged class to legislate for the country?

The Miner and His Mines.

The prizes in mining are few, the failures many; but there is always doubt enough to check undue expansion. A comparatively small number have reached the plane of success, while many have failed and fallen by the way. Shall those who are now hopefully toiling be punished for the success of the few? No braver or harder man ever courted fortune by the straightforward road of toil, sacrifice and privation.

Continued on Page 125.

The Sierra Flume and Lumber Company.

The first record of a flume being need for the transportation of wood or lumber occurred in Washington Territory—from the forests bordering on Puget sound to tide water. A flume was next constructed in Nevada for the purpose of supplying Virginia City with cord wood. This flume extended from the eastern slope of the Sierra to a dump near Carson City. The Antelope flume was, however, the first one built in California for lumber purposes. The construction of this flume was followed the next year by the Blue Ridge Company bringing lumber from the mountains near the dividing line in Tehama and Shasta counties to a point 12 miles north of Red Bluff on the Sacramento river, and this flume has since been continued to Red Bluff by the Sierra Company; and by a flume built by the Butte Lumber Company, extending a distance of 35 miles from the forests in the southeast of Tehama, where that county intersects Butte, to three miles east of Chico. For several reasons, mainly because of the large amount of capital necessary to be invested, to successfully carry on enterprises of this character, these several projects were not so remunerative as the promoters desired.

The flumes are generally constructed of lumber planking, 30 inches wide and 16 feet long. These are nailed together at the side, making a V-shaped trough or box. They are then fixed in brackets, thus forming a continuous channel for the passage of the water which is let into the flume from a diverted mountain stream. In the flumes constructed two or three years ago but two brackets were used to a box. In some of those of the Sierra Flume and Lumber Company three are used, thus adding to the strength of the flume. The rapidity with which the lumber is transported varies of course with the fall. With a down grade of one inch to the box (16 feet), or 27 feet to the mile, the lumber travels from two to three miles per hour. With a grade of two inches to the box, or 55 feet to the mile, the rate is about trebled, and the increased velocity is in a similar ratio where the grade is augmented. Thus a grade of five or six inches to the box insures a velocity of from 18 to 20 miles per hour. On the Blue Ridge division, the 30 miles from the mountains to the dump on the Sacramento river is made in about

three and a half hours. On the Chico branch, lumber put in at the Arcade mills reaches Chico, a distance of 40 miles, in less than four hours. Of course it is necessary to have men constantly engaged in watching the flume to prevent the lumber from bunching, as it is called. For this purpose a plank walk is constructed its entire length.

The Sierra Flume and Lumber Company are now operating 150 miles of V-flume for lumber transportation; one flume on Chico creek terminating at the town of Chico; one on Antelope creek, terminating at Sesma; and one on the waters of Battle creek, terminating at Red Bluff. On these flumes are in operation ten saw mills, with a continual capacity of over 300,000 feet daily, and an annual capacity of 50,000,000 feet. The Chico flume is 45 miles long, and carries lumber right into the yard at Chico. They can bring down 100,000 feet per day. If the lumber is placed in the flume at three o'clock, the last of it will be in Chico at six or half-past six o'clock. It costs 70 to 80 cents a thousand to ship the lumber in this way, whereas in the old way of hauling by teams it cost about \$10 a thousand to get it down the mountains.

These flumes are very expensive in some places, and skillful engineering is required to build them. In some places the trestle work upon which they are supported is 100 or 150 feet high. The Ink's creek crossing is 110 feet high and a third of a mile in length, with an arch in the center. The flumes cost from \$1,000 to \$2,500 a mile to build, and in places where high trestle work has to be constructed, the cost is increased.

The water to supply these flumes is no small item. It is collected from various spring and streams in the mountains, and run in feeders to the flumes. It takes a great deal of water to run the flumes, so they are kept busy while the water season lasts.

From Blue Ridge division there are at present two flumes, each 12 miles in length, running respectively from the Clipper and Defiance mills to a point called the Junction. At this point the two unite and form one flume, which extends a distance of 32 miles to the yards at Red Bluff. This piece of fluming is perhaps the finest piece of workmanship of this character yet attempted. It starts out with 2,100 feet of trestle work, from 60 to 120 feet high, over a ravine called Ink's creek, followed by 1,800 feet more over another known as Sharp's Flat, of an average height of 60 feet. There has also just been completed three and a half miles of new flume, connecting the Moscow mill with the Defiance flume, and seven miles more will shortly be commenced, by which advantage can be taken of the cheap transportation furnished by this means for forwarding lumber made at the Eureka mill. During the past season the average expenso of fluming lumber on the Chico division over about 40 miles of flume was about 60 cents per 1,000 feet. On the Sesma division there are 50 miles of flume in operation, and on the Chico 40 miles.

This trestle work has to be made very strong, braced and guyed in every direction, as the winds in the mountains are at times very high, and if the trestle work was not properly made the whole structure would come down. In some of the canyons the flume has to be fastened to the side of a perpendicular wall, where one could hardly suppose any work could be done. In some places the trestle has to be bolted and chained to the rock in the firmest manner. From the advertisement of the company in another column, any one may gain an idea of the magnitude of the operations conducted by it, by reading the figures given therein.

Mining and Farming.

There is probably no other country under the sun where the operations of mining and agriculture are so closely connected as in California. The generally conceived idea of a mining country is one where there is a barren, sterile region, mountainous and rocky, productive of nothing but minerals; where men are dependent for fruits and vegetables on some more favored section and which they are glad to leave as soon as wealth is obtained. Nothing could be further from the truth as far as California is concerned. For instance, all the quicksilver mines in the State are situated in regions otherwise devoted to farming operations. The gold quartz mines in the mountains are most of them surrounded by thriving farms and orchards, from which all kinds of fruits and vegetables may be procured. In the hydraulic mining districts the ranches, in many cases, cover areas of gold-bearing gravel, so that the land is both agricultural and mineral, causing frequent contests as to title.

It often occurs that the miners will buy land previously used for agricultural purposes, with the intention of putting it through the sluices. A case in point occurred, last week, in Amador county, where C. D. Horne and W. A. Neville purchased the ranch of W. Avila, at Butte City. The property embraces a splendid orchard, containing fruit trees of every variety in full bearing. Indeed, the orchard has long held the position as the finest garden in the county and has annually netted a handsome revenue to its owner. But the main reason that has induced the above-named gentlemen to

weighing over seven dollars. This town is in a mining region, and one formerly famous for the nuggets found there. These circumstances, are exceptional, of course, but serve to show that there is such a thing as picking up gold in the streets.

Full Text of the Silver Bill.

The following is the full text of the Silver Bill as it passed the Senate. The provisions of this bill are of vital importance to the mining interests of this coast:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

SECTION 1. That there shall be coined at the several mints of the United States, silver dollars of the weight of 412½ grains Troy, of standard silver, as provided in the Act of January, 18th, 1837, on which shall be the devices and superscriptions provided by said act, which coin, together with all silver dollars heretofore coined by the United States, of like weight and fineness, shall be a legal tender at their nominal value for all debts and dues, public and private, except otherwise expressed and stipulated in the contract; and the Secretary of the Treasury is authorized and directed to purchase from time to time silver bullion, at the market price thereof, not less than \$2,000,000 worth per month, nor more than \$4,000,000 worth per month, and cause the same to be coined monthly, as fast as so purchased, into such dollars; and a sum sufficient to carry out the foregoing provisions of this act is hereby appropriated out of any money in the Treasury not otherwise appropriated; and any gain or seigniorage arising from this coinage shall be accounted for, and paid into the Treasury as provided under existing laws relative to the subsidiary coinage; provided that the amount of money at any one time invested in such silver bullion, exclusive of such resulting coin, shall not exceed \$5,000,000; and provided further, that nothing in this act shall be construed to authorize the payment in silver of certificates of deposit issued under the provisions of section 254 of the Revised Statutes.

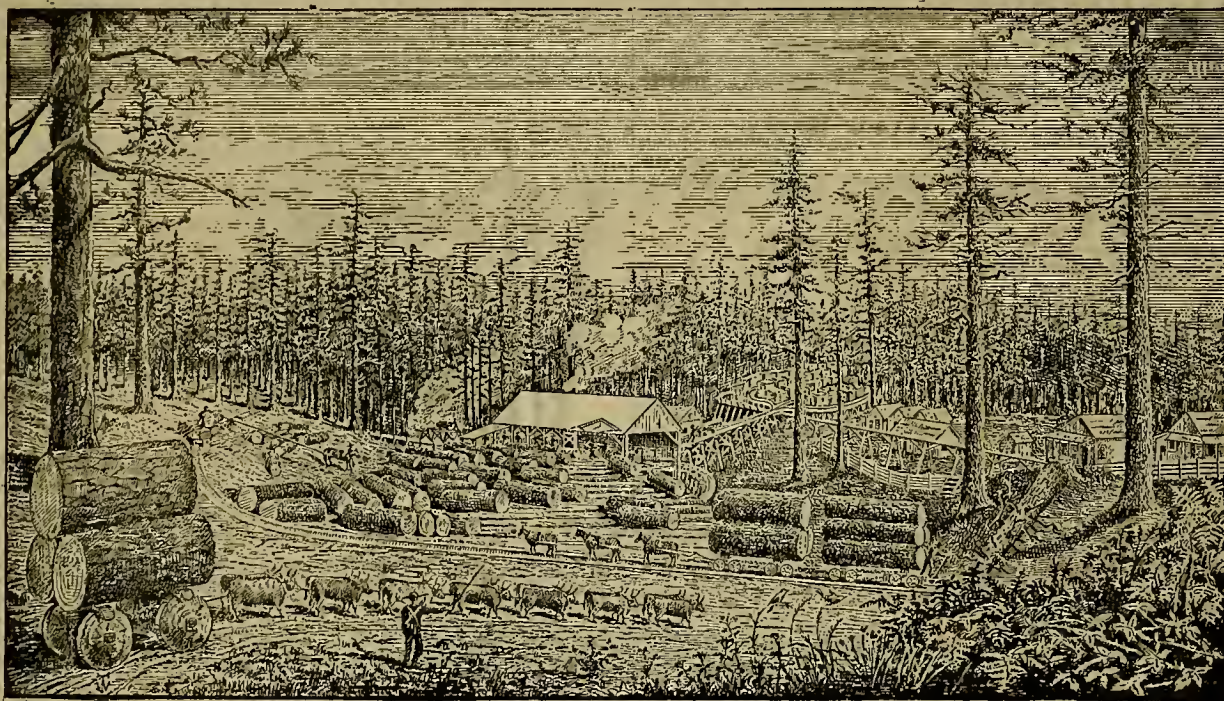
SEC. 2. All acts and parts of acts inconsistent with the provisions of this act are hereby repealed.

SEC. 3. That immediately after the passage of this act the President shall invite the governments of the countries composing the Latin Union, so-called, and such other European nations as he may deem advisable, to

join the United States in a conference, to adopt a common ratio between gold and silver, for the purpose of establishing internationally the use of bi-metallic money, and securing a fixity of relative value between these metals. Such conference to be held at such place in Europe or in the United States, at some time within six months, as may be mutually agreed upon by the Executives of the Governments so invited, or when any three of them shall have signified their willingness to unite in the same. The President shall, by and with the advice and consent of the Senate, appoint three Commissioners, who shall attend such conference on behalf of the United States, and shall report the doings thereof to the President, who shall transmit the same to Congress. Said Commissioners shall each receive the sum of \$2,500, and their reasonable expenses, to be approved by the Secretary of State. The amount necessary to pay such compensation and expenses is hereby appropriated out of any money in the Treasury not otherwise appropriated.

SEC. 4. That any holder of the coin authorized by this act, may deposit the same with the Treasurer or any Assistant Treasurer of the United States, in sums not less than \$10, and receive therefor certificates of not less than \$10 each, corresponding with the denominations of United States notes. The coin deposited for or representing the certificates shall be retained in the Treasury for the payment of the same on demand. Said certificates shall be receivable for customs, taxes, and all public dues, and when so received may be re-issued.

REPRESENTATIVE DAVIS has presented in Congress the resolutions of the California Legislature against subsidies to steamships engaged in the China trade, and asking a grant of proceeds of sales of public lands in California for purposes of irrigation and protection against mining debris.



THE MOSCOW MILL OF THE SIERRA FLUME AND LUMBER COMPANY.

The illustration given herewith shows the Moscow mill, the largest one belonging to the company. It is a steam mill, and is 45 miles from Red Bluff, in that division. This mill has a capacity of sawing 40,000 feet of lumber a day, and is one of the most complete on the Pacific coast. All the recent improvements in this class of machinery have been introduced. The tremendous logs are cut up and made into lumber ready for piling away with astonishing rapidity. Besides the large circular saws, gang-edgers, etc., there are cut-off saws and implements to utilize and trim the pieces cut off from the larger hoards, as they come from the circular saws, such as are not considered marketable. The lumber from this mill comes into Red Bluff. The mill is situated at an elevation of from 4,000 to 5,000 feet.

To the left of the engraving is a load of logs such as is hauled to the mill. While our artist was at the mill he saw one load, hauled by eight yoke of oxen, which weighed 54,000 pounds, the truck weighing four and a half tons. There were 7,346 feet of cut lumber in this one load, and probably one-third more in the logs. These immense loads are hauled from the woods to the mills. The diameters of these logs, respectively, was 62 inches, 53 inches, and 56 inches. The logs cannot be lifted on to the trucks, but by getting on a side hill and building a tramway on to the truck the logs are rolled on.

On one side of the mill is seen the burning waste pile. Back of the mill is seen the place where the lumber is piled up before being shipped down the flume to Red Bluff. The tramway is also shown, by means of which the logs are placed in position to be rolled down to the mill.

We have received from the publishers, Payot, Upham & Co., "Hinton's Hand Book of Arizona," which is for sale at this office, and which we will notice more fully next week.

buy it is the fact that 10 acres of gold-bearing gravel are included within its limits. Mr. Horne for months past has been working the adjoining claim, formerly owned by Yoakes. The last two or three clean-ups have been in the highest degree satisfactory. If not the richest gravel claim in the county, it is certainly not far behind the richest. Mining operations have been carried to the boundary line of the ground claimed by Avila, and to possess themselves of the extension of the auriferous channel, Horne and his partner have thought it advisable to buy out Avila.

The price paid for this ground was a low one, according to the *Ledger*, but as there was likely to be a contest over the mineral land, the owner thought it best to avoid litigation by selling out. The present owners will prosecute work energetically, and it is thought by the *Ledger* that the claim will take many years to clean out.

This instance is cited merely to show the close connection in this State of farming and mining sections. In many places a farming section sells all its produce to a neighboring mining community, so that the proximity of the interests is favorable to both. In fact, in almost any place where it is possible, where there is a flourishing mining camp, a number of persons will commence to till the soil and build up homes, knowing they will always have ready sale for their products.

Several of the towns of the interior of this State are built on ground which would pay to mine, and in a number of instances houses have been raised on props, while the ground underneath was mined out. When rich ore has been mined and transported to mill, men have made a good living picking up the pieces which dropped from cars and wagons, and working them. In Mokelumne Hill, as we see by the *Calaveras Chronicle*, quite a number of nuggets have been found in the streets since the heavy rains set in. A boy picked up one last week on Center street,

Information Concerning Patents

FOR THE

AUSTRALIAN COLONIES,

EAST INDIA, Etc.

The geographical position of San Francisco, and the fact of having a regular communication by means of a line of steamers, renders our location here particularly favorable for taking out patents in these colonies for United States inventions. For the same reasons we include with these instructions those for the East India patents. American inventors, as a general thing, are not aware that Australia presents a better field for them to patent their inventions in than almost any other country, the United States and England excepted.

Comparatively little is known in the United States of this vast continent situated at the antipodes, and the almost fabulous richness and depth of the soil, the vast strides with which she has advanced in population and wealth are little known.

A correspondent who has lived 19 years in Australia, says: "I have been a little surprised about one thing in connection with your inventors, and that is that they don't make more use of the patent laws of these colonies. It is true that it is somewhat expensive to patent in all the colonies, still it would pay in some cases, and in others it would answer to patent an invention in two or three of the colonies. An efficient reaper and binder would pay to patent in all the colonies; so would an invention for preserving raw meat, or for benefiting those engaged in wool growing, while any really good invention for the benefit of those engaged in gold mining might be advantageously patented in three or four of them. Many American inventions have already been patented here, and have been very remunerative, and, as a rule, when properly pushed, almost any good invention might be made valuable if patented here. Ten times as many British inventions are patented here as American ones, yet it is notorious that the inventive faculty is not near so largely developed in them as in the Americans."

The continent of Australia has an area of 3,000,000 square miles, or nearly as much as that of the United States. A large portion of the interior is waste and unsettled, but wherever the colonies have made a start they have made rapid progress, in population and civilization.

There are seven Australian colonies, five of which are upon the continent, and the other two upon the adjacent islands. Of those on the continent four only are of considerable importance, namely, Victoria, New South Wales, Queensland and South Australia. The fifth—Western Australia—is separated from the rest by nearly 2,000 miles, and is used as a penal station by Great Britain. The island colonies are New Zealand and Tasmania, the first consisting of three islands of considerable size, while the last comprises one island. In importance these colonies stand at present in the order named (leaving out Western Australia), and have a united area of 2,136,180 square miles, with an aggregate population of upwards of 2,110,368 inhabitants. Each of these colonies has a well arranged patent law, and many of the inventions patented in the United States, could be advantageously patented and introduced here.

Victoria.

The first colony in population and importance, though not in size, is Victoria. This colony has an area of 88,198 square miles, and a population of about 800,000 inhabitants. The capital of Victoria is Melbourne, a city of upwards of 240,000 inhabitants.

A patent may be obtained in this colony for any new and useful manufacture. An invention already patented elsewhere may be patented at any time during the continuance of the prior patent, provided it has not been used or illustrated in the colony. An examination is usually made to determine the novelty and utility of the invention.

A patent may be obtained by the inventor whether resident or non-resident, but a mere importer cannot become a patentee. The documents required to obtain a patent are petition, specification and drawings in duplicate and of a given size, one copy being on parchment. The specification must be signed and sealed by the inventor. No model is required.

The term of a patent is fixed at 14 years but expires with any prior patent. The patent is not required to be worked in the colony. It is subject to a tax of £15 at the end of the third year, and one of £20 at the end of the seventh year. The expenses of a patent for three years, inclusive of government tax and all charges is \$200.

New South Wales.

This colony has an area of 323,437 square miles and a population of about 600,000. Its capital is Sydney, situated at the head of a magnificent harbor, and distant from Melbourne about 600 miles. The pastoral and mining interests predominate at present, and the colony is in a highly flourishing condition.

A patent or letters of registration, as the document is called, may be obtained in this colony for any invention or improvement. The term is 14 years and a preliminary examination is had to determine the novelty and utility of the invention. The patent may be obtained by the inventor, his agent or assignee, either colonist or alien.

The documents required are a petition, duplicate specifications and drawings. The law does not require the invention to be worked. The cost of a patent for the entire term, including

government tax and all other expenses, is \$250.

Queensland.

This colony was set off a few years since from New South Wales, and has an area of 678,600 square miles and a population of upwards of 150,000. Its capital city is Brisbane.

A patent is granted in this colony to the inventor, his agent or assignee, for the term of 14 years, the same as in New South Wales. The documents required are also similar, a petition, duplicate specifications and drawings. The cost of a patent for the entire term, including all charges, is \$250.

South Australia.

This is the largest of the colonies, having an area of 914,730 square miles and a population of 198,257. Its capital is Adelaide.

Patents are granted in this colony for 14 years, an examination being made as to novelty. The documents required are a petition, duplicate specifications and drawings. The entire cost of a patent is \$250.

New Zealand.

This colony has an area of 105,000 square miles, and a population of 310,437. Its capital is Wellington, and its principal city is Auckland.

Letters of registration, however, are issued to *bona fide* holders of letters patented elsewhere, and have the same force as, and expire with, the original patent. To obtain letters of registration, a certified copy of the specification, drawings and prior letters patent, and a declaration of the applicant that he is the *bona fide* holder of such letters patent, must be filed. If made by the assignee, a certified copy of the assignment, and a declaration of the applicant must be filed. The entire cost of letters of registration in this colony is \$200.

Tasmania.

Patents are granted in this colony in essentially the same manner as in Victoria, and for the same time. The total cost is \$200.

Trade-Marks.

Trade-marks may be registered in the colonies of Victoria, New South Wales, Queensland, New Zealand and Tasmania. The cost of a Victorian trade-mark is \$60, and of the other colonies mentioned, \$50 each.

EAST INDIA.

An East Indian patent is granted for a term of 14 years, and must be for a new invention of public utility. The applicant must be the inventor, his executor, administrator, or assign, and may be a resident, non resident, British subject or alien.

The documents necessary are a petition, declaration, specification and drawings, together with five copies, one for each of the Presidencies. The cost of an East Indian patent is \$300.

Inventors will please write for any further information desired concerning the above colonies, the Canadas, and other foreign countries. Our American and foreign patent circular will be sent free on receipt of postage stamp.

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 ists, Mining Companies, Milling Companies, Prospectors,
 etc., to our stock of Clay Crucibles, Muffles, Dry Cups,
 etc., manufactured by the Patent Plumbago Crucible
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 been made Sole Agents for the Pacific Coast. Circulars
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Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Jan. 31.	Week Ending Feb. 7.	Week Ending Feb. 14.	Week Ending Feb. 21.
Alpha.	11 1/2	11 1/2	10 1/2	9 1/2
Alta.	8 1/2	8 1/2	7 1/2	6 1/2
Andes.	8 1/2	8 1/2	7 1/2	6 1/2
Alps.	8 1/2	8 1/2	7 1/2	6 1/2
Argenta.	1.35	1.20	1.10	1.05
Baltimore Con.	5 1/2	5 1/2	4 1/2	4 1/2
Belcher.	5 1/2	5 1/2	4 1/2	4 1/2
Best & Belcher.	18 1/2	18 1/2	17 1/2	16 1/2
Bullion.	4 1/2	4 1/2	4 1/2	3 1/2
Bechtel.	9 1/2	9 1/2	8 1/2	7 1/2
Bodie.	11 1/2	11 1/2	10 1/2	9 1/2
California.	3 1/2	3 1/2	3 1/2	2 1/2
California.	2 1/2	2 1/2	2 1/2	2 1/2
Challenge.	2 1/2	2 1/2	2 1/2	2 1/2
Chollar-Potosi.	3 1/2	3 1/2	3 1/2	3 1/2
Comstock.	5 1/2	5 1/2	5 1/2	5 1/2
Con Imperial.	5 1/2	5 1/2	5 1/2	5 1/2
Con Virginia.	2 1/2	2 1/2	2 1/2	2 1/2
Crown Point.	5 1/2	5 1/2	5 1/2	5 1/2
Day.	5 1/2	5 1/2	5 1/2	5 1/2
Day.	5 1/2	5 1/2	5 1/2	5 1/2
Eureka Con.	3 1/2	3 1/2	3 1/2	3 1/2
Exchequer.	3 1/2	3 1/2	3 1/2	3 1/2
Exch. & C.	3 1/2	3 1/2	3 1/2	3 1/2
Gen Thomas.	3 1/2	3 1/2	3 1/2	3 1/2
Grand Prize.	13 1/2	13 1/2	13 1/2	13 1/2
Gila.	7 1/2	7 1/2	7 1/2	7 1/2
Golden.	1 1/2	1 1/2	1 1/2	1 1/2
Gould & Curry.	1 1/2	1 1/2	1 1/2	1 1/2
Hale & Norcross.	11 1/2	11 1/2	11 1/2	11 1/2
Hussey.	7 1/2	7 1/2	7 1/2	7 1/2
Julia.	1 1/2	1 1/2	1 1/2	1 1/2
Justus.	1 1/2	1 1/2	1 1/2	1 1/2
Justus.	1 1/2	1 1/2	1 1/2	1 1/2
Joe Scates.	4 1/2	4 1/2	4 1/2	4 1/2
K. K. Con.	4 1/2	4 1/2	4 1/2	4 1/2
Kentucky.	2 1/2	2 1/2	2 1/2	2 1/2
Lucky.	2 1/2	2 1/2	2 1/2	2 1/2
Lead.	2 1/2	2 1/2	2 1/2	2 1/2
Leviathan.	2 1/2	2 1/2	2 1/2	2 1/2
Leeds.	2 1/2	2 1/2	2 1/2	2 1/2
Manhattan.	11 1/2	11 1/2	11 1/2	11 1/2
Meadow Valley.	3 1/2	3 1/2	3 1/2	3 1/2
Mexican.	14 1/2	14 1/2	14 1/2	14 1/2
North Con Virginia.	7 1/2	7 1/2	7 1/2	7 1/2
North Con.	11 1/2	11 1/2	11 1/2	11 1/2
North Con.	11 1/2	11 1/2	11 1/2	11 1/2
New Con.	5 1/2	5 1/2	5 1/2	5 1/2
Navajo.	8 1/2	8 1/2	8 1/2	8 1/2
Ophir.	5 1/2	5 1/2	5 1/2	5 1/2
Overman.	18 1/2	18 1/2	18 1/2	18 1/2
Panther.	4 1/2	4 1/2	4 1/2	4 1/2
Raymond & Ely.	9 1/2	9 1/2	9 1/2	9 1/2
Rock Island.	12 1/2	12 1/2	12 1/2	12 1/2
Sage.	3 1/2	3 1/2	3 1/2	3 1/2
Seg Belcher.	3 1/2	3 1/2	3 1/2	3 1/2
Sierra Nevada.	4 1/2	4 1/2	4 1/2	4 1/2
Silver Hill.	2 1/2	2 1/2	2 1/2	2 1/2
Solid Silver.	5 1/2	5 1/2	5 1/2	5 1/2
Star.	4 1/2	4 1/2	4 1/2	4 1/2
Trojan.	8 1/2	8 1/2	8 1/2	8 1/2
Union Con.	6 1/2	6 1/2	6 1/2	6 1/2
Union Con.	6 1/2	6 1/2	6 1/2	6 1/2
Wells-Fargo.	15 1/2	15 1/2	15 1/2	15 1/2
Woodville.	6 1/2	6 1/2	6 1/2	6 1/2
Yellow Jacket.	9 1/2	9 1/2	9 1/2	9 1/2

Sales at S. F. Stock Exchange.

Friday A. M. Feb. 15.	1100 Young America.	400/50c
425 Alta.	60 Yellow Jacket.	10 1/2 @ 10 1/2
200 Andes.	500 Alta.	8 1/2 @ 8 1/2
100 Alpha.	1000 Argenta.	1.10 @ 1.10
200 Best & Belcher.	1500 Andes.	8 1/2 @ 8 1/2
1200 Benton.	1000 Alpha.	10 1/2 @ 10 1/2
70 Chollar.	1000 Belcher.	11 1/2 @ 11 1/2
125 California.	500 Bullion.	3 1/2 @ 3 1/2
1200 Con Virginia.	200 Best & Belcher.	18 1/2 @ 18 1/2
350 Crown Point.	500 Bodie.	11 1/2 @ 11 1/2
500 Con Imperial.	500 Bodie.	11 1/2 @ 11 1/2
310 California.	200 Doyle.	2 1/2 @ 2 1/2
100 Day.	30 Bechtel.	9 1/2 @ 9 1/2
600 Exchequer.	750 Belle Isle.	5 1/2 @ 5 1/2
5 Eureka Con.	800 Belle Isle.	5 1/2 @ 5 1/2
180 Gould & Curry.	900 Con Virginia.	22 1/2 @ 22 1/2
340 Hale & Norcross.	800 Bodie.	11 1/2 @ 11 1/2
1250 Justice.	400 Bodie.	11 1/2 @ 11 1/2
900 Julia.	415 Crown P.	10 1/2 @ 10 1/2
70 Joe Scates.	550 Con Imperial.	7 1/2 @ 7 1/2
200 Kentucky.	385 California.	2 1/2 @ 2 1/2
1000 Leviathan.	1000 Day.	5 1/2 @ 5 1/2
105 Mexican.	2200 DeFrees.	1 1/2 @ 1 1/2
800 Morning Star.	2200 DeFrees.	1 1/2 @ 1 1/2
550 New York.	1000 Exchequer.	2 1/2 @ 2 1/2
300 Navajo.	1000 El Dorado S.	5 1/2 @ 5 1/2
200 North Con Vir.	1300 Endowment.	7 1/2 @ 7 1/2
200 Ophir.	300 Falcon.	1 1/2 @ 1 1/2
1000 Overman.	1400 Gould & Curry.	8 1/2 @ 8 1/2
450 Savago.	1000 Gila.	7 1/2 @ 7 1/2
705 Sierra Nevada.	900 Grand Prize.	13 1/2 @ 13 1/2
500 Silver Hill.	900 Gen Thomas.	3 1/2 @ 3 1/2
350 Solid Silver.	700 Hussey.	7 1/2 @ 7 1/2
350 St Louis.	200 Hale & Norcross.	10 1/2 @ 10 1/2
500 Succor.	2000 Hornet.	10 1/2 @ 10 1/2
105 Union Con.	1000 Independent.	1 1/2 @ 1 1/2
900 Trojan.	515 Julia.	2 1/2 @ 2 1/2
180 Union Con.	515 Julia.	2 1/2 @ 2 1/2
270 Utah.	1000 Jackson.	3 1/2 @ 3 1/2
1000 Woodville.	200 Kentucky.	9 1/2 @ 9 1/2
375 Ward.	400 Leviathan.	11 1/2 @ 11 1/2
3500 Wells-Fargo.	325 California.	2 1/2 @ 2 1/2
600 Yellow Jacket.	1000 Mexican.	13 1/2 @ 13 1/2

AFTERNOON SESSION.

135 Alta.	800 Golden Chariot.	1.00 @ 1.00
100 Argenta.	600 Gould & Curry.	1.00 @ 1.00
25 Best & Belcher.	1800 Hale & Norcross.	11 1/2 @ 11 1/2
400 Belcher.	4000 Homestake.	40 @ 40
200 Bodie.	1000 Hornet.	10 1/2 @ 10 1/2
200 Belmont.	1000 Independent.	1 1/2 @ 1 1/2
1200 Bodie.	600 Jackson.	1 1/2 @ 1 1/2
535 Con Virginia.	1100 Justice.	11 1/2 @ 11 1/2
125 California.	200 Leeds.	2 1/2 @ 2 1/2
700 Crown Point.	1000 Leopold.	40 @ 40
50 Chollar.	1000 Modoc.	25 @ 25
350 Con Imperial.	500 Meadows Valley.	20 @ 20
145 DeFrees.	1000 Martin White.	6 1/2 @ 6 1/2
720 Day.	1445 Navajo.	1 1/2 @ 1 1/2
50 Endowment.	275 Northern Belle.	10 1/2 @ 10 1/2
105 Eureka Con.	300 Ophir.	5 1/2 @ 5 1/2
200 Exchequer.	1000 Panther.	5 1/2 @ 5 1/2
1530 Grand Prize.	1000 Raymond & Ely.	9 1/2 @ 9 1/2
350 Hale & Norcross.	515 Silver Hill.	2 1/2 @ 2 1/2
500 Gen Thomas.	1000 Solid Silver.	5 1/2 @ 5 1/2
300 Hale & Norcross.	1000 Star.	4 1/2 @ 4 1/2
380 Hornet.	1000 Success.	3 1/2 @ 3 1/2
375 Hussey.	1000 Tippecanoe.	3 1/2 @ 3 1/2
575 Independent.	1000 Union Con.	6 1/2 @ 6 1/2
320 Justice.	1000 Utah.	9 1/2 @ 9 1/2
170 Julia.	1000 Wells-Fargo.	15 1/2 @ 15 1/2
230 Leeds.	1000 Woodville.	6 1/2 @ 6 1/2
200 Modoc.	1000 Yellow Jacket.	9 1/2 @ 9 1/2

Monday A. M. Feb. 15.

130 Alpha.	1000 Argenta.	1.10 @ 1.10
100 Andes.	450 Best & Belcher.	18 1/2 @ 18 1/2
200 Alpha.	1000 Bodie.	11 1/2 @ 11 1/2
30 New York.	1000 Bullion.	3 1/2 @ 3 1/2
85 Northern Belle.	300 California.	2 1/2 @ 2 1/2
65 New Con.	855 Con Virginia.	22 1/2 @ 22 1/2
850 Navajo.	1000 Crown P.	10 1/2 @ 10 1/2
100 Ophir.	500 DeFrees.	1 1/2 @ 1 1/2
100 Overman.	500 Gould & Curry.	8 1/2 @ 8 1/2
100 Panther.	225 Hale & Norcross.	10 1/2 @ 10 1/2
100 Raymond & Ely.	500 Hussey.	7 1/2 @ 7 1/2
500 Star.	225 Julia.	2 1/2 @ 2 1/2
350 Succor.	450 Julia.	2 1/2 @ 2 1/2
500 Sierra Nevada.	450 Julia.	2 1/2 @ 2 1/2
600 Silver Hill.	200 Joe Scates.	4 1/2 @ 4 1/2
1310 Tippecanoe.	500 Leviathan.	11 1/2 @ 11 1/2
600 Union Con.	1000 Mexican.	13 1/2 @ 13 1/2
1000 Ward.	1000 New York.	1 1/2 @ 1 1/2

Table of Highest and Lowest Sales in S. F. Stock Exchange.

700 North Con Vir.	515 @ 51 1/2	535 Grand Prize.	12 1/2 @ 12 1/2
430 Ophir.	51 @ 51 1/2	60 Gould & Curry.	1.00 @ 1.00
270 Overman.	20 @ 20	635 Golden Chariot.	1.00 @ 1.00
250 Sierra Nevada.	11 @ 11 1/2	350 Hussey.	1.40 @ 1.40
120 Savage.	11 @ 11 1/2	350 Hussey.	1.40 @ 1.40
200 Solid Silver.	5 1/2 @ 5 1/2	770 Hornet.	1.35 @ 1.35
625 Succor.	2 1/2 @ 2 1/2	300 Hamburg.	3 1/2 @ 3 1/2
170 Senator.	1 1/2 @ 1 1/2	420 Leopold.	38 @ 38
200 Trojan.	1 1/2 @ 1 1/2	1100 Independent.	1 1/2 @ 1 1/2
10 Utah.	1 1/2 @ 1 1/2	360 Justice.	11 1/2 @ 11 1/2
90 Union Con.	1 1/2 @ 1 1/2	445 Julia.	2 3/4 @ 2 3/4
2300 Ward.	1 @ 35c	300 Leeds.	2 1/2 @ 2 1/2
35 Yellow Jacket.	10 1/2 @ 10 1/2	420 Leopold.	38 @ 38
AFTERNOON SESSION.			
100 Argenta.	80c	1330 Modoc.	15 @ 15
50 Alps.	3	165 Mexican.	13 1/2 @ 13 1/2
90 Best & Belcher.	18 1/2 @ 18 1/2	100 Meadows Valley.	20 @ 20
100 Belmont.	60	90 Northern Belle.	10 1/2 @ 10 1/2
150 Bodie.	80	550 New Con.	90 @ 90
1900 Belle Isle.	65c	100 Overman.	16 @ 16
220 Bullion.	3 80	15 Ophir.	5 1/2 @ 5 1/2
183 Con Virginia.	22 1/2 @ 22 1/2	300 Overman.	16 @ 16
35 California.	22 1/2 @ 22 1/2	40 Rye Patch.	4 1/2 @ 4 1/2
5 Crown Point.	5 @ 5	90 Raymond & Ely.	9 1/2 @ 9 1/2
320 Con Imperial.	70 @ 65c	50 Star.	4 1/2 @ 4 1/2
500 Day.	85 @ 75c	1655 Silver Prize.	70 7/8 @ 70 7/8
225 DeFrees.	1 40	35 Sierra Nevada.	10 1/2 @ 10 1/2
150 Eureka Con.	45 1/2 @ 45 1/2	150 Savage.	11 1/2 @ 11 1/2
165 Exchequer.	3 40	165 Tippecanoe.	3 60 @ 3 60
395 Endowment.	70 @ 65c	50 Union Con.	6 1/2 @ 6 1/2
200 Grand Prize.	13 12 1/2	100 Utah.	9 1/2 @ 9 1/2
2000 Hamburg.	3 1/2 @ 3 1/2	120 Woodville.	6 1/2 @ 6 1/2
2000 Gla.	13 12 1/2	935 Young America.	65 @ 65
1900 Hussey.	1 40 1/2 @ 1 40 1/2	Wednesday A. M. Feb. 20.	
1000 Huron.	15c	125 Alta.	8 1/2 @ 8 1/2
200 Idaho.	10c	850 Bodie.	11 1/2 @ 11 1/2
185 Independent.	10c	5 Best & Belcher.	18 1/2 @ 18 1/2
805 Leeds.	2 1/2 @ 2 1/2	845 Belcher.	11 1/2 @ 11 1/2
480 Leopold.	35c	825 Benton.	3 80 @ 3 80
2500 Modoc.	30 25c	300 Bodie.	11 1/2 @ 11 1/2
80 Mexican.	13 1/2 @ 13 1/2	745 Con Virginia.	22 1/2 @ 22 1/2
310 Manhattan.	10c	290 Crown Point.	10 1/2 @ 10 1/2
100 Meadows Valley.	20c	65 Chollar.	2 1/2 @ 2 1/2
15 Martin White.	6 1/2 @ 6 1/2	600 Con Imperial.	65 70 @ 65 70
955 Navajo.	2 15 1/2 @ 2 15 1/2	635 DeFrees.	1 1/2 @ 1 1/2
55 Northern Belle.	10 1/2 @ 10 1/2	100 Confidence.	1 1/2 @ 1 1/2
400 New Con.	95c	100 Day.	20 @ 20
50 Rye Patch.	4 1/2 @ 4 1/2	390 Exchequer.	3 1/2 @ 3 1/2
100 Raymond & Ely.	9 1/2 @ 9 1/2	35 Gould & Curry.	8 1/2 @ 8 1/2
350 Silver Hill.	2 90 @ 2 90	285 Justice.	11 1/2 @ 11 1/2
550 Silver Prize.	75c	100 Julia.	2 20 @ 2 20
880 Young America.	70c	300 Joe Scates.	4 40 @ 4 40
Tuesday A. M. Feb. 19.			
85 Alpha.	10 1/2 @ 10 1/2	400 Kentucky.	3 40 @ 3 40
750 Alta.	8 1/2 @ 8 1/2	40 Lady Wash.	6 1/2 @ 6 1/2
60 Andes.	75c	850 Leviathan.	35 40 @ 35 40
150 Argenta.	3 90 25c @ 3 90 25c	25 Mexican.	13 1/2 @ 13 1/2
40 Belcher.	4 1 1/2 @ 4 1 1/2	120 Mexican.	13 1/2 @ 13 1/2
195 Best & Belcher.	18 1/2 @ 18 1/2	900 North Con Vir.	4 1/2 @ 4 1/2
300 Bodie.	11 1/2 @ 11 1/2	520 New York.	1 1/2 @ 1 1/2
750 Con Imperial.	70c	430 Overman.	16 18 1/2 @ 16 18 1/2
405 Crown Point.	5 40 @ 5 40		
30 Chollar.	3 33 @ 3 33		
85 Con Virginia.	22 1/2 @ 22 1/2		
115 California.	27 1/2 @ 27 1/2		
30 California.	2 1/2 @ 2 1/2		
170 Challenge.	7 1/2 @ 7 1/2		
100 Day.	20c		
615 Exchequer.	3 1/2 @ 3 1/2		
180 Gould & Curry.	8 1/2 @ 8 1/2		
235 Hale & Norcross.	10 1/2 @ 10 1/2		
265 Justice.	11 1/2 @ 11 1/2		
300 Julia.	2 20 25c @ 2 20 25c		
300 Joe Scates.	4 30 @ 4 30		
400 Kentucky.	3 40 @ 3 40		
40 Lady Wash.	6 1/2 @ 6 1/2		
850 Leviathan.	35 40 @ 35 40		
25 Mexican.	13 1/2 @ 13 1/2		
1040 Morning Star.	1 1/2 @ 1 1/2		
900 North Con Vir.	4 1/2 @ 4 1/2		
520 New York.	1 1/2 @ 1 1/2		
430 Overman.	16 18 1/2 @ 16 18 1/2		

Continued from page 120.

President Lincoln, in one of his messages to Congress, declared them worthy not merely of ordinary protection of law and justice, but of extraordinary measures of encouragement. The mining regions of the country frown with the most forbidding aspects of nature. In his restless wanderings in search of the precious metals, the miner sees no stately forests, no smiling lawns, nor luscious fruits to enchant the senses or soothe the mind; but it is in torrid valleys and on bare, bleak and trackless mountains that gold and silver are sought and only occasionally found. In his search the miner leaves behind him every luxury of life, every convenience of comfort, and every necessity of growth. The metal which the silver miner seeks to obtain is not, as is usual in gold mining, gathered from alluvial sand by unskilled toil. It can only be wrenched from its embraces of adamant by exhausting labor. It can only be separated from the base surrounding by expensive machinery and efforts of patient science. No dollar of gold or silver obtained by mining has ever involved the robbing of one man by another, but has been fairly won in a struggle between the rude forces of nature and the dauntless energy of man, and was an addition to the wealth of the human race. My constituents have

Right as Sacred as Those of the National Creditor.

It is my high duty and privilege to defend them on this floor, and I shall make no apology for the ardor and persistency with which I discharge this duty and exercise this privilege. Does anybody doubt that the Senators from Massachusetts would rise with indignation if anybody should stigmatize as "hulder-gamblers," "whalshone speculators," and "members of an oil ring," the bronzed whalers of Nantucket and New Bedford, who, when fortune has favored, bring safely into port the wealth which they have not obtained by wrecking railroads or by watering railroad stocks; but which they have created by struggling with cold, the darkness, the storms, the ice-loss of the Arctic seas?

And why should I restrain my indignation when I hear this stigmatizing epithet of "Bonanza swindlers" applied to my constituents who are toiling in the gloomy passages, under exhausting heats, two thousand feet below the surface of the earth, away from the cheering light of day, in an industry which is believed to pay less profit upon the average than any other known to man. I do not shrink from a comparison of the ways and methods of the acquisition of wealth in mining industry on the Pacific Coast with the ways and methods of its acquisition anywhere, and least of all with the ways and methods of Wall street, where these attacks upon my constituents originate.

The silver miners of the United States have shirked no duty either in peace or war; they demand neither protective legislation for exemptions from their full share in the burden of taxes, nor special privileges of any kind; but they have

Special Interests in the Production of Silver. And it is a task equally easy and grateful to me to vindicate them. They are engaged in a lawful and honest industry, and who between the two oceans, are better entitled to fair treatment than they? The people of Nevada do not shrink from any comparisons to which they can be subjected. It was because they were known to be loyal and patriotic that Nevada was admitted as a State into the Union. It was admitted during the crisis of civil war as an added bulwark to the defence and liberty of the country. If their numbers were few, they have maintained good government; efficiently protected life and property; liberally endowed institutions of education and beneficence, and have so well ordered their finances that their Governor has been recently urged to convene the Legislature in extra session to reduce taxes, in order to prevent the accumulation of an inconvenient surplus in the treasury. I am ready to meet here and everywhere any comparison between this vague, shadowy and unsubstantial after-born expectations and understandings of the holders of bonds, promising coin, that they shall be paid in gold, as against the

Equitable and Lawful Claim

Of my constituents—that one of the money metals of the Constitution shall not be stricken down after they have crossed a continent to explore for it, and devoted their lives and fortunes to its development and production. I confront the charge that they seek an unjust addition of 10% to the value of silver by its remonetization, with the demand that the robbing of 10% of their just earnings by its demonetization shall no longer be persisted in. When they embarked in the business of silver mining they had every right to expect and understand that it would continue to be money, as it has always been as far back as history or tradition goes. He had no reason to believe it would be denied us as money, to which it has been consecrated by the unwritten law of all ages, and to which it was dedicated by this Constitution of the United States. Has the recently formed expectation of bondholders to be paid in gold any foundation either in equity or antiquity comparable

To the Right of the Miner

Of the Pacific coast to expect that silver would continue to enjoy its ancient franchise of coinage? The bondholders have invested their money upon a contract embodied in a law which was constructive notice to them of its terms. Direct notice was also given them

by the law itself being referred to on the face of each bond, together with the terms on which they are by that law made payable. The bondholders' right to a faithful performance of this contract is as earnestly insisted on by the advocates of this bill as by its opponents. The miners not only have invested their money, but have risked health and life upon the faith of the then existing law, which was a solemn pledge to them that the precious metals were both to continue to be used as money. The bondholder asks that laws shall be continued in force which were enacted after his contract was made, and which changed its term to his advantage and disadvantage of the nation, and especially of the silver miner, whose industry it threatens to destroy.

The Miner asks that the Constitution Shall be observed, and that this law under which his industry was organized and upon which it was founded shall be restored. These two demands are incompatible with the other. To the impartial judgment of the American people the miner submits their comparative equity.

An Immense Brass Casting.

There was completed last week at W. T. Garratt's brass foundry a "digester" for the new candle works in this city, which is the largest brass casting ever made in this city, and outside of hells as large probably as was ever made in the United States. When completed the "digester" weighed over six tons. It is elliptical in form, 21 feet long, and 44 inches outside diameter. The gun metal of which the casting is composed is one inch thick. The digester is the largest one in the United States, and the only one made of gun metal. When the company started to have their machinery made they telegraphed to the principal establishments of the United States concerning this digester, none of which would undertake it, saying it was not practicable. Mr. Garratt, however, having made a smaller one of the same kind, undertook the job, and the result was a perfect casting, as smooth as could be.

The casting was made in two pieces and the two pieces joined together. The lower half was placed in the ground in a pit and the other half suspended over it, the two edges being within an inch of each other. Then the inside and outside cores were made so as to get a thicker body of metal at the joint. Before commencing the cast, a charcoal furnace was placed in the lower half of the digester, to get it all expanded. The two pieces were then brought within an inch of each other and arrangements made to prevent an overflow of metal. The metal was then allowed to flow through until the edges of the two castings were at a melting point. Then they stopped off the flow and let the spaces left by the cores fill up. The rib at this joint is about five inches thick. The operation was very successful, although the entire work took about 70 days. Three nozzles were cast in one end of the digester, one to admit steam, one for the grease and fat and the other for the pump-rod of the vacuum-pump. This operation of casting was superintended by W. T. Little, who naturally feels very proud of the job, which is a credit to the works and to the enterprise of the foundrymen of the coast. The new candle and soap works, for which this casting is to be used, is known as the Bay Soap and Candle Works. The proprietors are Isidor Levenson and Alexander W. Winter, of this city, and Samuel Levenson, of Sacramento. The works are in South San Francisco, and will shortly start up.

Academy of Sciences.

The regular meeting of the California Academy of Sciences was held on Monday night, President George Davidson presiding. J. G. Lemmon read a paper on the *Darlingtonia Californica*, or California pitcher plant.

Donations were received as follows: Skull and horns of a deer from Behring sea, Captain O. Eldridge; two unrecognized fishes, H. Edwards; fresh water fishes from Weber creek, Utah, Blunt & Chapman; coal and sandstone, Coos bay, James T. Gibbs; gold quartz, Star mine, Maricopa county, Arizona, by the Golden Star mining company; silver and copper ores from the Silver Queen mine, Pinal county, Arizona, Mrs. Smith, 470 Jessie street; 21 specimens of minerals, W. G. H. Harford; two boxes of 222 specimens of minerals from New York. Prof. Davidson read a paper on a new formula for interest, not in the books. A. Del Mar made some remarks on interest and was invited to read a paper on the subject.

Referring to the question among astronomers as to the merits of the refractor and reflector telescope, Prof. Davidson said recent astronomical observations proved that the refractor was the more powerful instrument.

A DIGEST of decisions of the Land Office in relation to mining laws; a list of patented mines; the laws regulating the disposal of mineral land; and the instructions of the Land Office thereunder, are to be found in "Copp's Hand Book of Mining Laws," recently published. This is a little work useful for every miner or prospector in the country. Price \$1, for sale by Deway & Co., 202 Sansome street, San Francisco.

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING, FEBRUARY 5TH.
TUBES FOR WIRE-ROPE RAILWAYS, TWO CASES.—W. Eppelsheimer, S. F.
STEERING PROPELLER.—T. F. Levens, Cascades, W. T.
BLAST AND REVERBERATORY FURNACES.—C. Bennett, Clifton, A. T.
BREECH-LOADING FIRE-ARMS.—W. R. Finch, Enreka, Cal.
WINDMILL WHEELS.—A. Klotz, Vallejo, Cal.
MERCURY CONDENSER.—C. E. Livermors, Cal.
SWAGE FOR SAW TEETH.—N. W. Spaulding, S. F.
STREET PAVEMENT.—W. H. Stow, Chicago, Ill. and H. M. Stow, S. F.
REISSUES.
COMBINATION UNDER-SUITS.—Clara S. Bradly, S. F.

The Mechanics' Institute Fair.

We have received the report of the 12th Industrial Exhibition, under the auspices of the Mechanics' Institute, which has just been published. It gives a complete detailed history of the last exhibition, with the list of exhibits, awards, etc., reports of jurors and committees, etc. The building, being free from all debt, has been turned over to the Institute by the Board of Managers.

We understand that the Board of Directors of the Mechanics' Institute have determined to hold their 13th Industrial Exhibition in August next, commencing on the first Tuesday in that month, and continuing for five weeks or more, so as not to interfere with the State Fair at Sacramento. The lease of the ground upon which this pavilion stands expires with this year, and it is probable that the 13th Exhibition will be the last in that locality. However, the Managers may succeed in securing an extension of their lease for five years longer. A. B. McCreery is the owner of the land. It is rather early yet to announce any of the arrangements which are being made, but the Managers intend to introduce many new features, and make the 13th fair superior in every way to the 12 that have preceded.

WOODWARD'S GARDENS has the following new attractions: The buffalo chase; large whale skeleton; new museum; improvements in the zoological department, besides the other features which have made it popular.

Information Wanted.—Any information as to the whereabouts of Mr. John Donohue, who left Ireland for Idaho City, in April, 1876, will be thankfully received by a friend who is inquiring for him. Address P. O. Box 2361, San Francisco, Cal.

AYER & SON'S MANTAL contains information of much value to advertisers; sent free. Address N. W. Ayer & Son, Advertising Agents, Times' Building, Philadelphia.

METALS.

[WHOLESALE.]

WEDNESDAY, M., February 20, 1878.

IRON.		
American Pig, ton.....	28 00	@30 00
Scotch Pig, ton.....	28 00	@30 00
White Pig, ton.....	28 00	@30 00
Oregon Pig, 100.....	21 00	@23 00
Refined Bar, 100.....	21 00	@23 00
Horse Shoes, keg.....	5 00	@5 50
Nail Rod.....	—	@ 75
Norway, Oval.....	—	@ 75
COPPER.		
Sheathing, lb.....	34 00	@ 35
Sheathing, Yellow.....	21 00	@ 22
Sheathing, Old Yellow.....	12 00	@ 13
Composition Nails.....	24 00	@ 25
Composition Bolts.....	24 00	@ 25
STEEL.		
English Cast, lb.....	13 00	@ 14
Anderson & Woods, ordinary sizes.....	15 00	@ 16
Drill.....	15 00	@ 16
Flat Bar.....	14 00	@ 15
Flow Steel.....	8 10	@ 12 1/2
TIN PLATES.		
10x14 1/2 Charcoal.....	7 50	@ 8 50
Banca Tin.....	23 00	@ 24
Australian.....	17 00	@ 17 1/2
ZINC.		
By the Cask.....	9 00	@ 10
Zinc Sheet 24 in, 7 to 10, lb.....	9 00	@ 10
7 1/2 in, 11 to 14.....	10 00	@ 11
8 1/2 in, 8 to 10.....	11 00	@ 12
8 1/2 in, 11 to 10.....	11 00	@ 12
NAILS.		
Assorted sizes.....	3 15	@ 3 25
QUICKSILVER.		
By the lb.....	43 00	@ 45

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]
SAN FRANCISCO, February 13, 3 P. M.
LEGAL TENDERS IN S. F., 11 A. M., 98 @ 98 1/2. SILVER, 3.75 @ 3.75.
GOLD IN NEW YORK, 121.
BARS, 99 @ 99 1/2. SILVER BARS, 8 @ 15 1/2 cent. disc.
EXCHANGE ON NEW YORK, 1 1/2; on London bankers, 4 1/2.
Commercial, 50; Paris, five francs @ 50 dollar; Mexican dollars, 24.
LONDON CONSOLS, 95 1/2; Bonds, 105 1/2.
QUICKSILVER IN S. F., by the cask, 46 @ 47 1/2.

Mining and Other Companies.

Manzanita Consolidated Gravel Mining Company. Location of works, Nevada County, California. Location of principal place business, San Francisco, California.

Notice is hereby given that at a meeting of the Directors, held on the nineteenth day of February, 1878, an assessment (No. 1) of twenty-five cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the Company, Room 8, No. 215 Sansome Street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the twenty-fifth day of March, 1878, will be delinquent and advertised for sale at public auction, and unless paid

ment is made before, will be sold on Monday, the fifteenth day of April, 1878, to pay said delinquent assessment, together with costs of advertising and expenses of sale.

THOS. J. OWENS, Secy.
Office, Room 8, No. 215 Sansome Street, San Francisco, Cal.

Summit Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Mineral Point Mining District, Plumas County, California.

Notice.—There is delinquent upon the following described stock, on account of assessment (No. 1), levied on the tenth day of December, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Aul, Geo.....	330	200	\$10 00
Aul, Mrs. Geo.....	183	200	10 00
Boring, J. C.....	32	1200	60 00
Brown, M. B.....	45	200	10 00
Hallsted, A. A.....	121	500	25 00
Hallsted, A. A.....	122	500	25 00
Hallsted, A. A.....	123	500	25 00
Hallsted, A. A.....	124	500	25 00
Hallsted, A. D.....	125	500	25 00
Hallsted, A. D.....	115	1250	62 50
Hallsted, A. D.....	117	500	25 00
Hallsted, A. D.....	118	500	25 00
Hallsted, A. D.....	119	500	25 00
Hallsted, A. D.....	120	500	25 00
Hallsted, A. D.....	121	100	5 00
Hallsted, A. D.....	162	100	5 00
Hallsted, A. D.....	163	100	5 00
Hallsted, A. D.....	164	100	5 00
Hallsted, A. D.....	165	100	5 00
Hill, F.....	37	200	10 00
Hallsted, Joseph.....	106	200	10 00
Hallsted, Joseph.....	107	200	10 00
Hallsted, Joseph.....	108	200	10 00
Hallsted, Joseph.....	109	200	10 00
Hallsted, Joseph.....	110	200	10 00
Hallsted, Joseph.....	82	200	10 00
Ingerson, H. H.....	53	500	25 00
Ingerson, H. H.....	54	500	25 00
Long, J. O.....	61	200	10 00
Long, J. O.....	62	200	10 00
Leonard, F. A.....	49	500	25 00
Martin, A., Trustee.....	26	200	10 00
Martin, A., Trustee.....	81	200	10 00
Martin, A., Trustee.....	82	200	10 00
Martin, A., Trustee.....	98	100	5 00
Martin, A., Trustee.....	99	100	5 00
Martin, A., Trustee.....	102	100	5 00
Martin, Robert.....	29	200	10 00
Quigley, Chas.....	136	200	10 00
Oatman, J. E.....	42	200	10 00
Oatman, E. F.....	43	200	10 00
Peck, A., Trustee.....	114	4000	200 00
Peck, E. A., Trustee.....	9	1000	50 00
Peck, E. A., Trustee.....	69	100	5 00
Peck, E. A., Trustee.....	70	100	5 00
Peck, E. A., Trustee.....	71	100	5 00
Peck, E. A., Trustee.....	72	50	2 50
Peck, E. A., Trustee.....	73	50	2 50
Peck, E. A., Trustee.....	74	200	10 00
Peck, E. A., Trustee.....	112	200	10 00
Peck, E. A., Trustee.....	113	200	10 00
Peck, E. A., Trustee.....	152	500	25 00
Peck, E. A., Trustee.....	153	500	25 00
Peck, E. A., Trustee.....	154	1000	50 00
Purkitt, J. H.....	51	500	25 00
Peck, A., Trustee.....	155	3000	150 00
Turrell, M. H.....	47	200	10 00
Turner, J. W.....	63	200	10 00
Turner, J. W.....	64	200	10 00
Turner, W.....	65	200	10 00
Whiting, F. B.....	28	200	10 00

And in accordance with law, and an order of the Board of Directors, made on the fifth day of February, 1878, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, on Wednesday, the thirteenth day of March, 1878, at the hour of two o'clock p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. W. CLARK, Secretary.
Office, Room 2, 418 California Street, San Francisco, Cal.

Taylor Mill and Mining Company.—Principal place of business, City and County of San Francisco, California. Location of works, Garden Valley Mining District.

Notice is hereby given that at a meeting of the Board of Directors, held on the nineteenth day of February, 1878, an assessment of five (5) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold and silver coin, to the Secretary, at the office of the company, No. 607 Montgomery Street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the twenty-seventh day of March, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the seventh day of April, 1878, to pay said delinquent assessment, together with costs of advertising and expenses of sale.

SAMUEL S. MURPHY, Secy.
Office, 607 Montgomery Street, San Francisco, Cal.

The assessment levied on capital stock of the Welch Consolidated Quicksilver Mining Company on the fifth of December, 1877, is hereby rescinded by order of the Board of Directors.
J. P. FORBES, Secy.
San Francisco, California, January 26th, 1878.

The Welch Consolidated Quicksilver Mining Company.—Principal place of business, San Francisco, Cal. Location of works, Mount Diablo Mining District, Contra Costa County, Cal.

Notice is hereby given that at a meeting of the Board of Directors, held on the fourteenth day of February, 1878, an assessment (No. 1) of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 7, No. 420 Montgomery Street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the twenty-first day of March 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the sixteenth day of April, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

J. P. FORBES, Secy.
Office, Room 7, No. 420 Montgomery St., San Francisco, Cal.

Wide Awake Prospecting & Mining Company.—Location of principal place of business, San Francisco, Cal. Location of works, Picket-Post, Pinal County, Arizona.

Notice is hereby given that at a meeting of the Board of Directors, held on the sixteenth day of February, 1878, an assessment (No. 3) of two (2) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 6, No. 232 Sutter Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on Tuesday, the nineteenth day of March, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the sixteenth day of April, 1878, to pay the delinquent assessment, together with costs of advertising and the expenses of sale. By order of the Directors.
C. QUINN, Secy.
Office, Room 6, No. 232 Sutter Street, San Francisco, Cal.

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Also, numerous other engravings of mines and scenes, comprising Mineral Park, Fort Whipple, Castle Dome, Oatman Flat, the Rio Verde Valley, Montezuma's Well, the Salt River Ruins, Indians, Public Buildings, Ancient Ruins and Remains, etc. In addition to these illustrations, the Hand-Book will contain

An Old Spanish Map of Arizona

And contiguous Territory, never before published; a copy of the famous Father King Map, and profile maps of the Mining District of Mohave County, in which the McCrackin mine is located; of Castle Dome District, Yuma County; of the Bradshaw District, near Prescott, where the Peck mine is worked; of the Pimlico, in which the famous Silver King is located; the Globe, where the Wheatfield, Stonewall Jackson and Miami mines are found; and of the extraordinary rich Santa Rita Districts, the Aztec and Tyndall.

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One man, per day.....\$ 3 50
One man, per day.....3 00
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Cost of 20 tons.....\$13 50
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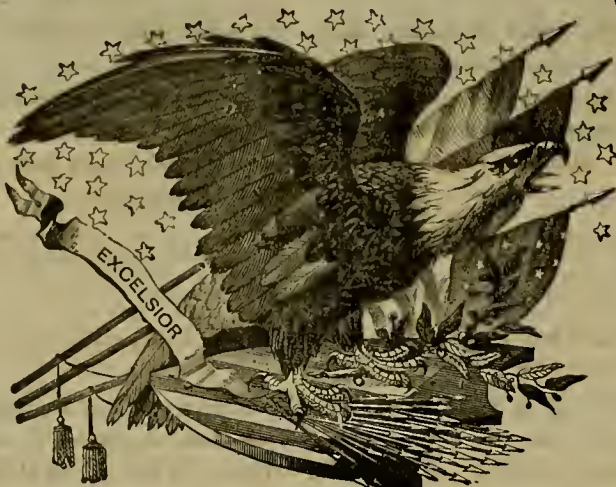
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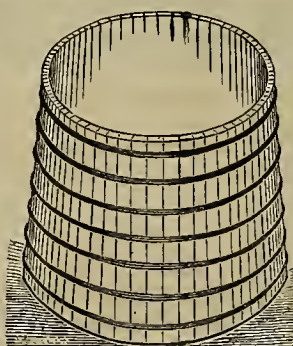
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, MARCH 2, 1878.

VOLUME XXXVI.
Number 9.

The Forster-Firmin Amalgamator.

The history of gold and silver mining is a record of inventions for overcoming the obstacles which naturally arise in extracting a small amount of metal from a large quantity of ore. These various inventions have been so numerous and generally so unsuccessful, that anything bearing the name of a new invention in this line is difficult to introduce. We give herewith the description and engravings of a new method of amalgamating, which at least merits the attention of our mining readers, whether prejudiced against new devices or not. The various der-

show sections of the improved washer. By reference to these engravings it will be seen that the apparatus is a simple tube with attachments for feeding the ore, mercury and steam. In working (Fig. 1), the pulverized free ore is fed through the hopper, *B*, into the tube, *A*, the mercury passes from the cup, *F*, in a continuous stream, which may be adjusted to any desired quantity from the thickness of a cotton fiber up; this mercury as it leaves the conduit pipe, *e*, is atomized or broken up into the smallest particles short of vaporizing, and impinges upon the stream of ore as it falls from the hopper, the force of the steam admitted by pipe, *D*, not only atomizes the mercury, but carries the ore and mercury forward with great rapid-

communicates the motion to the rollers and scrapers, the mercury amalgam collects and falls into the water space in the conical bottom; the upward spiral force of the water which is injected, either through the driving shaft or near the bottom of the vessel, carries of the waste ore with less force than is ordinarily used, thereby preventing loss of product. The details will be apparent to any one familiar with this class of machinery.

It will be noticed that this is not a mere variation of existing inventions, but is a new method of incorporating mercury with metals, in order to give a rapid continuous amalgamation with a simple apparatus. This is designed more particularly for working tailings, but of course can

Chances For Work in the Mines.

These are hard times. The city and country are full of idle men—not idle from choice but from dire necessity. The most of these men are able to perform, and would gladly engage in almost any kind of rough work that would afford them a livelihood. Now it occurs to us that there must be many places in the mining districts of California where these men could make small wages working the drift diggings, reworking tailings, or, just now, when there is everywhere so much water, running sluices in the ravines and gulches that can only be worked



FIG. 4. THE FORSTER-FIRMIN AMALGAMATOR AND ORE WASHER.

vices for amalgamating have all had for their object the diffusion of mercury through the bulk of the ore, so that the precious metal and mercury would come in contact; many of these fail in practice, of course. The best machine for amalgamating is that which fulfills the following requirements: That which gives the largest return of precious metals; that works the largest quantity of ore in a given time; that is simple in construction and not likely to get out of order; can be worked economically, be easily transported, fixed and worked; and that will work the poorest ores at a profit. These requirements Messrs. T. A. D. Forster and George J. Firmin, of Norristown, Pa., inventors of the process under consideration, attempt to fill.

Fig. 4 on this page gives a general view of the machinery, and Figs. 2 and 3 on page 137

ity until the co-mingled substances are projected forcibly against the side of the vertical tube, *G*, whence they fall into the washer or receiver. When in work the tube is filled with an atmosphere of mingled ore and mercury in the finest state of division; should any particle of metal escape contact in the horizontal tube, it cannot avoid contact when the ore and mercury are projected against the vertical tube.

It is claimed that an unlimited amount of ore may be treated by this process, as the attendants have only to feed the ore and remove the deposit. The inventors state "that with only a three-inch tube from three to five tons of ore can be beaten per hour."

Figs. 2 and 3 represent the improved washer in sections, the operation of which is apparent. The ore amalgam and surplus mercury are passed from the amalgamator into the washer, the shaft

be used on any ore. A machine of this description has been shipped to Australia, where it is reported as working satisfactorily. Other machines are now being built by the inventors, who are about to fairly introduce the method in this country. Applications for rights or license to manufacture should address the inventors as above.

WHAT was supposed to have been an incendiary fire destroyed not long since the hoisting works and shaft at the Hughes Brothers' quartz mine, Chilo gulch, Calaveras county, and came very near causing the death of all the men employed in the mine.

ON Sunday morning last, a cadet at West Point, named Tobin, shot and killed another named Gilbert.

in extremely wet seasons, like the present. The miners residing in the interior must know of many such places, and we invite them to inform us as to their locality, and the conditions under which they can be availed of by hard-working men of small means. We are aware that the most of these places are claimed, but not always. Of the gulches and placer grounds that can only be worked for a short time in very wet winters, many must be unclaimed and unoccupied, and it could harm no one to have them turned to account. Where owned, these neglected diggings might be leased or let on shares, and thus be made to yield some income.

If parties acquainted with opportunities of this kind will write us full particulars, we will publish the same, in the hope that it may benefit them, furnish work to the unemployed, and be of advantage all round.



CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents—Eds.

French Creek, Siskiyou County.

EDITORS PRESS:—Cory & Kingry have dissolved co-partnership in their French Creek quartz mines, I am informed. Cory is working three hands; they did not sell to Wilson of San Francisco. The claims are prospecting well. Hartstrand's mill is near completion. Root's claim is idle now, but he informs me that soon he will put on a force and go to taking out quartz. Grooms is tunneling into his claim. His last run with the arastra put about \$300 in his pocket. This claim prospects as high as \$33.50 per ton, with an average of \$15. Root, Small, just across the divide from the French Creek mines, sold half of his claim to Deuny for \$1,000, gold. Some other sales are reported, but I do not know the particulars. Welsh is pipping on his placer diggings; has over 2,000 feet of eight-inch pipe. This season promises to be a wet one, which maketh the miner's heart beat rapidly. We expect French Creek to take a prominent part among the successful mining districts during the year 1878, and return the money that has been invested in the mines, with huge interest. The miners are jubilant over the thought of deep snow on the mountain ranges and plenty of water next summer. Success attend them. R. D. NUNNALLY.

On the Density of Atoms.

(Written for the Press by C. H. AARON.)

If I understand rightly the philosophy of the new chemistry, it is supposed that the molecules of which solids, liquids, and gases are composed, remain individually unchanged in the physical changes of matter from one to the others of these conditions, and the atoms of which the molecules consist are equally unchanged individually, when the molecules are chemically decomposed or recombined. Thus the transformation of water into steam, as well as the expansion of gases, consists simply in the wider separation of the molecules by the agency of heat and not in the expansion of the individual molecules, and the decomposition of water or steam into the constituent gases, means only the dissociation of the atoms of hydrogen from those of oxygen, followed or accompanied by the re-association of each atom with another of its own kind, forming molecules of the respective gases, the change being simply one of position, association, and mode or degree of motion, the atoms themselves remaining the same. In other words, chemical combination is looked on as "only a more intimate mechanical mixture" of the atoms, governed by certain laws of quantitative relation, attraction and repulsion.

This view of the case would seem to lead to some rather surprising conclusions as to the density of atoms and molecules when in a gaseous state, and admitting the truth of Avogadro's law, which is the basis of the whole system, may possibly throw some light on their absolute size, and consequently on the dimension of intermolecular and interatomic spaces.

A mass of ordinary matter, whether compound or, so-called, elementary, cannot be more dense than the molecules of which it is composed, nor can any molecule be more dense than the atoms of which it consists; it may be less dense, because the molecules or atoms may not be close together, but it cannot be more so. From this it follows that the molecules of steam, being simply water molecules more widely separated, are at least as dense as water, and this density is not greater than the mean density of the two atoms of hydrogen and one atom of oxygen of which the water molecule is made up. Nor is the conclusion invalidated by the apparently anomalous phenomena exhibited in the case of certain metallic alloys, the density of which differs from the mean density of their constituents, these being ascribable to a difference in the intermolecular spaces, the existence of which spaces prevents our arriving at the actual density of the molecules or atoms, the most that we can say being that the densest known condition of any element gives us the least possible density of the atoms of that element.

As regards water and steam, it is a self-evident proposition that, if steam consists only of water molecules more widely separated, and endowed with a different mode of motion, the density of the molecule of steam is the same as that of the molecule of water, and if the number of molecules in a given volume of steam is known, it is an easy matter to calculate the size of the molecules, and, consequently, of the average intermolecular space.

But a molecule of water consists of two atoms of hydrogen joined to one atom of oxygen, and as the density of the molecule cannot be greater than of its constituents, nor, conversely, that of the constituents (the mean) less than that of the molecule, it follows that the least possible mean density of two atoms of hydrogen, and one atom of oxygen is the same

as that of the water molecule, say m .

Now if we assume the ratio of densities of the atoms of hydrogen and oxygen, to be that indicated by the specific gravities of these gases in volume, which is 1 to 16, it will be clear that the densities of H and O, as derived from that of water, are, $O = \frac{3m}{16}$ and $H = \frac{3m}{16}$. But $M = 252.69$ grains per cubic inch, whence $O = 673.84$ grains per cubic inch, and $H = 42.115$ grains per cubic inch, that is, per cubic inch of atom matter.

This may be surprising to those who have been accustomed to regard hydrogen as the lightest of known bodies, and the question naturally arises, how, if it is so dense, does a balloon rise in air? The answer is simple. In the first place oxygen and nitrogen, of which air is composed, remain, under our present assumption, respectively 16 and 14 times as heavy as hydrogen, and secondly (and independently of our assumption as to the ratio of density between the gas atoms) the apparent levity of hydrogen is due to the intermolecular spaces, which in a balloon containing, sensibly, nothing but hydrogen, are supposed to be vacuous, or only occupied by the hypothetical, imponderable ether, which amounts to the same.

In a word, a balloon rises by displacement, independently of the absolute density of the material particles by which it is occupied, but not filled. It would do the same if it contained absolutely nothing but a cannon ball, provided the ball could be made to strike against its walls in all directions with rapidity and force enough to keep those walls from collapsing, and so to displace a weight of air greater than that of the apparatus.

But the density of the hydrogen atom may be much greater than that found above, which is based on the assumption that the ratio of its density as compared with the oxygen atom is as 1 to 16, that being the ratio of weight of equal volumes of the two gases, an assumption for which, however, we have no warrant, for we do not know that the atoms of hydrogen are of the same size as those of oxygen, so that although we may feel confident, admitting the truth of Avogadro's law, that one atom of oxygen weighs as much as 16 atoms of hydrogen, yet, if the first should be also larger than the second, the ratio of densities would be very different. (The size of a molecule (not atom) of hydrogen, according to Wurtz's deductions, is to that of a molecule of oxygen as 20 to 17.)

Suppose now, a single molecule of hydrogen, consisting of two atoms joined together, of a density which, though possibly less than that of the atom, is yet, from the very nature of the molecular theory, vastly greater than that of a volume of the gas, to be set free in the atmosphere. We have then the spectacle, visible indeed only to the "scientific imagination," of a piece of matter of great density flying about in straight lines with immense velocity, among innumerable other pieces of matter, probably still more dense, and of greater absolute weight, which, however, are kept from falling in a mass to the earth by their mutual repulsion (or unceasing frictionless motion and impingement with perfect elasticity) colliding now with one, now with another of these denser particles, but as often rebounding into vacuous spaces. What ought such a molecule to do? Ought it to rise or fall? It would seem neither one nor the other especially, but just as it might happen to be impelled by impact with the molecules of the air. In short, I should suppose that such a molecule, being vastly smaller than the intermolecular spaces, and having consequently no displacement, would not float in the ordinary sense in the air. Does this view assist to explain the phenomena of diffusion?

But water is not the densest known compound of oxygen, nor even of hydrogen. Let us take solid carbonic anhydride. Its density is a (no books of reference here) the density of its molecule is not less than a . This molecule is composed of one atom of carbon and two atoms of oxygen; the mean density, then, of these three atoms is not less than a . Take the density of the diamond as the least possible density of the carbon atom, and from that and the known mean density of the three atoms $= a$, deduce the density of the oxygen atom, or rather, its least possible density. The value found will differ probably from that deduced from water, though whether it will be greater or less I cannot say for want of data; it is immaterial, however, to my present purpose, which is simply to suggest a line of research, which, in connection with Wurtz's theory, may perhaps lead to something definite. There is no contradiction in the different values which may be obtained for the density of any given atom, for, in accordance with the hypothesis, the greatest density found must be accepted as the minimum for the particular substance in question.

With the least possible density of the atom of hydrogen, the weight of a given volume of the gas, and the number of atoms in that volume, it is easy to compute the greatest possible size of the atom.

The number of molecules in a cubic inch of hydrogen is estimated by Thompson to be 10^{23} ; the number of atoms is then $10^{23} \times 2$; the weight of the atom is

Weight of cubic inch of hydrogen.

$$2 \times 10^{23}$$

and its maximum possible size, in fractions of a cubic inch =

$$\frac{\text{Weight of atom}}{\text{Weight of cubic inch of atom matter.}}$$

For myself, I do not yet quite believe in molecules or atoms; to my mind it is a case for a Scotch verdict.

English Tribute to American Science.

Sir Joseph Dalton Hooker, President of the Royal Society of London, England, in his address at the recent anniversary meeting of the Society, paid the following deserved tribute to the high character and efficiency of the geological and geographical explorations carried on in this country:

Of the many surveys of the United States Territories undertaken, some by the Central Government, others by State Governments, and still others by private enterprise, more or less aided by public funds, none has effected so much for science as that directed by Dr. Hayden. Its publications, distributed with great liberality, are in every scientific library, and its director is honored no less for the energy and zeal with which he has labored as a topographer and geologist, than for the enlightened spirit in which he has sought to render the resources of the survey available for the advancement of all branches of natural knowledge by every means in his power, and with admirable impartiality.

Having obtained an extended leave of absence from my official duties at the Royal Gardens, I, at the close of our last session, accepted an invitation from Dr. Hayden to join his survey, and, in company with our foreign member, Prof. Asa Gray, to visit, under his conduct, the Rocky mountains of Colorado and Utah, with the object of contributing to the records of the survey a report on the botany of those States.

I have thus had some opportunity of learning for myself the extent and value of the operations of the survey, which are so interesting that I venture to think a brief sketch of its rise and progress and a few of its results may be acceptable to you.

When the Territory of Nebraska was admitted into the Union in 1867, Congress set apart an unexpended balance of £1,000 for a geological survey of the new State; and Dr. Hayden, then a young man who had distinguished himself as an indefatigable paleontological observer and collector (in various expeditions since 1853), was appointed to conduct it. In 1868 the operations of the survey were continued and carried westward into the Rocky mountains of Wyoming, the rich tertiary and cretaceous beds of which were examined and described in detail, and the famous Yellowstone district, with which Dr. Hayden's name will ever be associated, was reconnoitred. The value of the survey was immediately appreciated, and in 1869 a large appropriation was voted by Congress for placing it on its present footing under the supervision of the Secretary of State for the Interior. In 1869 and 1870 operations were carried on in Colorado and New Mexico; and full reports on the meteorology, agriculture, zoology and paleontology of these regions, of great interest and importance, were drawn up and subsequently published. In 1871 the detailed survey of the Yellowstone district was begun, and those marvelous natural features were carefully studied, which have excited the liveliest interest in Europe, and have induced Congress, on Dr. Hayden's representations, to appropriate the whole area as a Government reserve, thus securing to naturalists free access to natural phenomena which in other places, both in Europe and America, are too often monopolized by speculators and closed to the public.

In 1872 the survey was further extended, and was organized into two corps, each provided with a topographer, geologist, mineralogist, meteorologist and naturalist, and the Territories of Idaho and Montana were embraced in its operations; in 1873 it was pushed into Colorado, thence into Utah, and on its completion in 1876, an area of not less than 70,000 square miles, much of it exceedingly mountainous, had been included in the survey.

The literature of the survey consisted, in 1876, of 41 volumes, classified as follows: 1, annual reports, with maps and sections; 2, bulletins for giving speedy publicity to new facts; 3, miscellaneous publications, comprising tables of elevations, catalogues of plants and animals, and meteorological data; 4, monographs on various branches of natural history, especially paleontology, copiously illustrated with admirable plates in quarto, among which are the works of Leidy, Lesquereux, Cones, C. Thomas, Cope, Parry, Meek, Packard, Silliman, Hayden himself, and others, all of whom are well-known on this side of the Atlantic; lastly, the number of photographs now exceeds 4,000, and includes, besides geological and geographical features of great interest, views of ancient architectural remains, and of 1,200 Indians, belonging to 74 tribes.

In giving these particulars, I speak from some personal knowledge. I wish the same could be said of the local habitation of the survey and its museum, which, I am assured, contains a very extensive and instructive collection; but these are at Washington, and my pressing duties here and at Kew prevented my visiting the Federal capital.

The most important scientific results hitherto derived from the labors of Dr. Hayden and his parties are unquestionably the geological, such as the delineation of the boundaries of the cretaceous and tertiary seas and lakes that occupied more than one basin of the mountains of central North America, and the marvelous accumulation of fossil vertebrates that these ancient shores have yielded. Over an area of many hundred thousand square miles in North

America there have been found, within the last very few years, beds of great extent and thickness, of all ages, from the Trias onwards, containing the well-preserved remains of so great a multitude of flying, creeping and walking things, referable to so many orders of plants and animals, and often of such gigantic proportions, that the paleontologist of the States, with museums vastly larger than our own, are at a loss for space to exhibit them. So common, indeed, are some species, and so beautifully preserved, that I saw numbers of them, especially insects, plants and fishes, exposed for sale, and eagerly purchased by travelers, with confectionery and fruit, at the stalls of the railway stations, from the eastern base of the Rocky mountains all the way to California.

An examination of some of these fossils has brought to light the important fact that in North America there is no recognized break between the cretaceous and tertiary beds. This is due to the interpolation of a vast lignitic series, the fossils of which furnish conflicting evidence. Concerning this series, Dr. Hayden, who has traced it over many hundred miles, observes ("Report of Geological Survey, 1874, page 20,") that the character of its paleontological, as well as of its strictly geological results is such, that whether the entire group he placed in the lower tertiary or upper cretaceous is unimportant, and that the testimony of paleontologists will probably always be as conflicting as at present.

I must not send my notices of some of the labors of our scientific brethren in the United States without expressing my admiration of the spirit and the manner in which the Government and the people have co-operated in making known the physical and historical features of their country, and my conviction that the results they have given to the world are, whether for magnitude or importance, greater of their kind than have been accomplished within the same time by any people or government in the older continents. How great would now be our knowledge of the climate and natural features of India and of our colonies had the excellent trigonometrical surveys of the one, and the territorial and geological surveys of the others been supplemented by reports such as those to which I have directed attention.

Georgetown, New Mexico.

A correspondent of the *New Mexico Herald*, writing from Georgetown in that Territory, says: The prospects of our camp have never been better. In fact it is very encouraging to some of us to have lived here and bemoaned for some years past hoping and longing for better times and a prosperous future. We have just learned with great delight, that there is a good prospect of our having a quartz mill erected in this camp, within a very short time. If there is any place or mining camp in Grant county that a mill will pay, it is certainly Georgetown. Where it is possible, the mill should come to the ore, and not the ore to the mill, as the transportation alone costs the miners, where they have to haul ore 20 miles or more, a very considerable sum during the year—more, really, than the mining of it very often. Then there is in this camp as well as in every other a great deal of very low grade ore that will not bear transportation, but will pay very well if worked in a mill on the ground. Besides a mill will put new life into the people as well as the camp, and when the fact shall be made known abroad that there is a ten-stamp mill in Georgetown it cannot help but attract considerable attention and be the means of bringing "bone and sinew" as well as capital into the camp. A mining camp without a mill is like a farm without a plow, so let her come. They cannot eat up any too soon for their own benefit as well as ours.

We have seen Bremen's scale or graduated price-list which he pays for the different grades of ore, which appears to suit the miners here very well, though they cannot understand altogether that ore will dry out 25%, notwithstanding it has been snowed on. Ore will hardly absorb one-fourth of its weight of water, even if weighed immediately after getting wet.

Hill and Lucas took out upwards two tons of ore on Monday last, that will run not less than \$200 per ton, on their lease on the "Commercial." Dietz and Fletcher are taking out good ore on their lease on the "Satisfaction." Lynch and Fitch have taken a lease upon a part of the "Satisfaction," and have struck, to all appearance, a good pocket. John Backus is also getting good ore and in considerable quantity on his lease on same mine. Tom Nolan is piling up some good ore out of his shaft on the "McGregor." John and Murdoch McGregor are doing likewise. Wm. H. Holman (Rusty) is sinking a shaft up the hill to the west of the old works on his lease on the last above-named mine. He is now down some 70 or 80 feet, and expects as soon as he strikes bedrock to take out good pay, as he is on a line with some good streaks of ore. The "McNulty" and "Rob Roy" are turning out good ore in good quantities.

There have been a great many arrivals of miners from the northern territories during the past week. Some are getting employment, and others are waiting anxiously for the same.

A new industry has been opened in Bingham by the Bates & Egan mill. Out of forty-five tons of gold ore from the Hampton mine, that would not pay a cent to ship, a \$3,600 bar was extracted.

MECHANICAL PROGRESS.

AMERICAN AXES IN ENGLAND.—Ex-Premier Gladstone has become the Horace Greeley of England, and wields the American axe as freely as he writes pamphlets. More than this, the announcement is made that the American style of axe has been introduced by enterprising English manufacturers, and they have ground their tools by getting the great liberal to turn the crank. The narrative is in this wise: A Sheffield firm about the year 1873, commenced the sale of an excellent American patent axe, which was shown and attracted considerable notice in the trade at the South Kensington exhibition of that year. The blade was the best polished steel and the handle of hickory, and, inspired with a happy thought, the firm recently presented one of the highly-finished specimens to the statesman woodman, who not only accepted the gift, but has also used the axe. Acknowledging the gift, Mr. Gladstone writes: "Gentlemen, I am so glad you have added that useful article, the American axe, to the list of our home productions, and I thank you for favoring me with a specimen, which seems, as much trial as I have made, to possess all the merits of the original. I find it necessary to study efficiency in proportion and weight, and it is under this issue that I think the American axe comes out well, especially for soft and free-grained woods. The handle is, I think, excellent, but I always wish it were cut straight across at the end, at a right angle to its direction or axis. I remain, gentlemen, your faithful servant, W. E. Gladstone. December 13th, 1877." This make for the future, we understand, is to be termed "The Gladstone wedge axe."

RELATIVE COST OF WATER AND STEAM POWER.—The cost of the water power equipment at Lowell was, for canals and dams, \$100, and for wheels, etc., another \$100 per horse power. But this, as a first experiment, was more costly than a similar equipment need be. A Maine newspaper says that at Saco the expense incurred was \$175 per horse power; but at a later period, for turbines with high heads the expense would be less. A construction and equipment, solidly carried out, with the latest improvement in wheels, would not cost over \$200 per horse power, and would under favorable circumstances cost less. An estimate at Penobscot was for \$113.50 per horse power. If the construction be with wooden dams, and the equipment with lower grade wheels, then the cost would be about \$50 per horse power, and although the construction would be less permanent than the more solid, it would outlast any steam apparatus. On the other hand, Fall River estimates of steam equipments, exclusive of foundations and engine houses, run from \$100 to \$115 per horse power. A Boston authority gives \$115 per horse power for nominal 300 horse power and upward, inclusive of foundations and masonry. Similarly, a Portland authority places it at \$100 per horse power. The actual cost of steam equipment in the water works of various cities of the United States varies from \$150 to \$300 per horse power.

CHOOSING A SCYTHE.—The disposition of steel in a scythe is to be best understood by seeing one which has been broken across the blade. Sometimes tools of this class are steeled "naked," so that all the steel shows itself at once on the top side of the blade, but this plan is not to be recommended. It is better to have iron on both sides of the steel which just shows itself along the edge, and runs in toward the back to stiffen the blade and to form a constant cutting edge as the tool wears away. Now, in buying a tool, bear in mind that the most steel may show in the one steeled naked, because all that is there is in sight, but in the other case there would be a great deal more steel useful for carrying an edge, although it would show less because the bulk of it would be hidden between the iron. It will not do, then, to be deceived by appearances. The best plan is to depend on a good maker for good steel and sufficient of it.

INSPECTION OF BRIDGES.—The New Haven engineering society has been moved by the Tariffville accident to petition the legislature for additional enactments to secure the safety of railroad bridges. They propose that the railroad commissioners shall inspect all the 300 bridges of the State, at the rate of at least 20 in 1878, and 30 each succeeding year, the results of the inspections to be recorded to the minutest particulars, and the records to be kept open to the public, and the conclusions of the examinations to be embodied in the annual report.

PLAIN AND GALVANIZED IRON WIRE.—The *Telegraphic Journal* says that in reply to a communication addressed to them by Mr. G. B. Prescott, the well-known American electrician, a number of the European telegraph administrations have, without exception, given the result of their experience as in favor of galvanized wire on the score of ultimate economy. It appears from these reports that the duration of non-galvanized wire for telegraphic purposes in Europe is from 15 to 20 years. Galvanized wire that has been in use some 25 years gives little sign of deterioration.

TOUGHENED GLASS.—M. Siemens, the well-known manufacturer of Dresden, has devised a process of hardening and tempering glass, which promises to be of more practical utility than that of M. Bastie. This process consists in heating, then suddenly cooling the glass to be hardened and tempered; but when the articles are such as are usually molded, the hardening and tempering are accomplished at the same time as the pressing—that is, the molten glass is run into suitable molds, and while still highly heated, is squeezed, the molds having the effect of giving the necessary cooling without resorting to the liquid bath of M. Bastie. The material employed for these molds depends on the nature and thickness of the glass. In ordinary practice, however, it is found that cast-iron molds maintained at a temperature of boiling water or thereabout, and earthenware molds kept quite cool, yield very satisfactory results. The liquid glass may be conveyed direct to the molds, or may be taken from the melting furnace on the blower's pipe, and shaped in the mold, but it is preferable to heat the articles after shaping, before pressing and cooling them.

CLEOPATRA'S NEEDLE.—The steam-tug *Anglia*, with the *Cleopatra* in tow, passed Margate on the 20th of January in the afternoon, and Gravesend about 11 o'clock on Monday forenoon. At Gravesend she was made fast to a buoy, and waited for the tide to run up. Shortly before one she cast off and proceeded up the River Thames, her departure being witnessed by a large number of persons who crowded the pier and waterside, and cheered lustily. Blackwall was reached shortly before three o'clock, and the *Cleopatra* was safely placed in dock. The *Cleopatra* has not shipped the slightest quantity of water. The tug *Anglia* was navigated by Captain John Tracey, the towing captain was David Glere, and she had a crew of 17 hands all told. The *Cleopatra* was manned by Captain Carter and five hands. Queen Victoria telegraphed to Mr. Dixon her gratification at the safe arrival of *Cleopatra's* Needle.

THE TELEPHONE AT THE HOUSE OF COMMONS.—On Tuesday evening communication was established between the English House of Commons and the office of the London *Daily News* in Bouvere street, by means of the telephone, which is especially attached to the ordinary telegraph wires running between the House of Parliament and the *Daily News* office. Conversation was distinctly audible despite the noise from the other wires, and part of the Parliamentary debate and summary in Wednesday's paper was received at the office of the newspaper by this agency.

NO AMERICAN IRON AT PARIS.—If the *Iron Age* is correctly informed, there will not be a single exhibit of American iron or steel at the coming Paris exhibition. A great deal will go over in higher forms, as in castings of various kinds, hardware and machinery, but very little, if any, will be shown in an unwrought state. This is a matter of the keenest disappointment, as there has never yet been at any of the European exhibitions an approach to anything like a fair exhibit of our manufactures in these important lines.

LARGEST OIL TANKS IN THE WORLD.—There have just been erected at the works of the National Storage Company, Communipaw, N. J., says the *Iron Age*, three enormous oil tanks, the largest ever built. Their dimensions are: Diameter, 90 feet; height, 30 feet; and their capacity is 35,000 barrels. There were used in their construction 372 tons of the best rolled iron, the plates of the lower courses being three-eighths of an inch in thickness; those of the upper courses three-sixteenths.

HINT ON DRILL CHUCKS.—A writer in the *Polytechnic Review* says that whoever has drill chucks that screw on to the spindles of their drilling machines, can save themselves a great deal of trouble by dividing the thread part into four equal spaces, and cut away all the thread on the opposite quarters. Then by cutting out the thread on the inside of the chuck at two opposite quarters, the chuck can be put on and made fast by a single quarter turn.

THE AUSTRALIAN MARKET FOR AMERICAN MANUFACTURES.—One of the leading New York iron manufacturers in answer to the question, "Which is the best export market now offered?" said, "Australia and New Zealand." It really seems so. There we find more intelligent labor and there they demand the most approved tools. It does an Englishman good to transplant him. "The Englishman in Australia is a Yankee."

AMERICAN DREDGE FOR NICARAGUA.—The American Dredging Co. have built a dredge for the government of Nicaragua, which is to be shipped in parts for erection at Greytown. It is a dipper dredge, with bucket of one cubic yard capacity. The hull is 5-16 inch plate iron, 60 feet long and 22 feet wide, with 5 feet depth of hold. It has double cylinder engines 6 by 15 inches, and locomotive tubular boiler 2 feet wide, 11 feet 6 inches long and 4 feet high, constructed for burning wood.

COLD AND HEAT.—The Victoria bridge across the St. Lawrence at Montreal is more than a foot shorter in winter than in summer, and if provision were not made for the change, something would have to break.

SCIENTIFIC PROGRESS.

Government Work at the North Pole.

The Naval Committee of the National House of Representatives has reported favorably upon the Howgate Polar Expedition bill. We extract the following from the report: "It provides for a long stay, which will give ample opportunity for observations and the conduct of scientific inquiry under the most favoring circumstances. It provides that an intelligent system shall be pursued under the direction of the National Academy of Sciences. We have ascertained to our satisfaction that the results yielded by prior explorations in the Polar seas have incalculably benefited the whole world; that the knowledge acquired by experiment and discovery in that region can be obtained in no other way and in no other section of the globe; that such knowledge is an important factor to the regulation of commerce which is absolutely dependent, so far as decreasing the perils of the deep and enlarging boundaries of navigation are concerned, upon the knowledge of physical laws. There has never before been an opportunity afforded so promising in results as the one which now presents itself. To make such explorations entirely successful, it is essential that simultaneous observations be had at different points within the Arctic Circle, and for continuous periods of time. England, during the present year, will fit out two vessels, under the explorer Nares, on a Polar expedition via east coast of Greenland. Sweden, in 1878, under the auspices of Prof. Nordenskjöld, will explore the Polar regions via Norway across to Behring's strait. Holland has determined upon another. Germany, under the direction of the Arctic Exploration Society, has an Obi expedition, commanded by Captain Wiggins, now on duty. Russia, during the coming spring, will push forward an ethnological expedition to the Obi and Irtysh."

BRINE IN THE OLD RED SANDSTONE.—A paper was recently communicated to the Manchester, England, Scientific Society, by Prof. Edward Hull, director of the Geological Survey of Ireland, "On the occurrence of Brine in the New Red Sandstone at Warrington." Having recently had occasion to visit Warrington, Mr. Hull was shown specimens brought up from a boring-hole made in search of water at the Dalham Ironworks. It was with much surprise that he learned that the water met with was strongly impregnated with salt, and on visiting the bore-hole he had an opportunity of tasting the water, which appeared to be as strongly saline as that pumped at Norwich. The proportion of saline matter ranged from 4,100 to 4,600 grains per gallon. This surprise was caused by the belief that the water was drawn from the Bunter sandstone, and the occurrence of brine in this formation was, fortunately for the cause of water supply, very exceptional. The water became salt at a depth of 370 feet to 500 feet. The boring had since been continued down to 900 feet into red and mottled red sandstone, micaceous and faulty, with pots of hard red marl. An examination of the specimens left no doubt on Mr. Hull's mind that the strata penetrated belonged to the lower beds of the Keuper division. His explanation of this occurrence of saliferous beds at Warrington was that they were let down between two faults—one to the north and the other to the south of the valley of the Mersey. The direction of these faults probably corresponded with that of the river valley itself for some distance—a little north of east, and south of west. In the former direction they probably extend till they terminate against the great Warrington fault, which crosses the river in a northwest direction, with a downthrow to the east of about 500 feet or 600 feet.

THE AILANTHUS.—The common ailanthus is dioecious. It is said that only the male trees have a disagreeable odor when in blossom, and nurserymen have been recommended to propagate only the female form for shade trees in towns and cities. Mr. I. C. Martindale, of Camden, in the *Botanical Bulletin* records a case of a tree heretofore male which has this season sent out a branch with female flowers and which has perfected fruit. In the present state of the science of vegetable physiology, botanists look for these sexual changes in every dioecious plant and understand the indirect cause bringing them about; but it is always a great gain to have the practical fact of change, rather than theoretical possibilities, and herein lies the great value of Mr. Martindale's observation in the case of the ailanthus.

AFRICAN EXPLORERS' ARTS.—Dr. F. M. Hildebrandt gave an entertaining account last month, before the Berlin Geographical Society, of his adventures in African exploration. His adroitness in dealing with the natives, not less than his pluck in the presence of danger, receives just praise from *Nature*. In one instance he was obliged to play the part of a magician, and utilized his official dignity by having specimens collected of all the different animals and plants in the neighborhood. Over the collection incantations were pronounced, so that it passed for a "fetish," before being carefully packed away. On another occasion, when he was attacked by natives, he levelled his camera at them as if it were a weapon of war, and charged upon them with it. They retreated in dismay.

EFFECTS OF A MINE FIRE.—There was lately a large coal mine on fire near Pittston, Pa. The local paper in its description of the event says: "On the hills leading to it can plainly be seen immense volumes of steam rising upwards, caused by the intense heat escaping from the numerous caves in the ground, and coming in contact with the cold air on the outside. As we approached the cracks in the ground foretold a heavy 'working' of the heated mass and although at first we were not intent upon venturing further, the numerous adventurers caused us to follow. Our route brought us over the most dangerous approaches, and each scene that was presented as we gazed down the fiery depths foretold an extensive body of burning debris. At some of these openings, which have nearly caved in, the volumes of heat and sulphur which rushed out made it impossible for any one to stay there long with safety, and we were forced to change our location numerous times to be freed from the heated atmosphere. The extent of the fire is supposed to be eight acres and all the area is one burning mass, with the rock to a white heat to the surface at many of the openings where the rock crops out. The ground is covered with cracks, and from appearance is settling down, as the huge pillars of coal underneath are consumed."

THE FORMATION OF HAILSTONES.—Prof. Osborne Reynolds, in a paper recently read before the Manchester Library and Philosophical Society, propounds a new theory to account for the formation of hail, which is thus summarized by the *American Manufacturer*. He considers that both the shape and structure of the hailstone are such as would result from the larger particles of the condensing moisture of a cloud descending more rapidly than others, and consequently overtaking those beneath them. By the combining of these particles a still greater velocity is acquired, and a consequent increased rapidity of growth of the stones. The shape of the hailstone is not that of more or less imperfect spheres, as appears on a cursory examination, but rather that of imperfect cones or pyramids with spherical bases. The stones are striated with lines radiating from the vertex. In proof of his theory Prof. Osborne has succeeded in forming hailstones artificially by projecting a stream of fog against a small object. Here the cloud rises to meet the stone rather than the stone falling through the cloud. In this respect the experiment would appear to hear almost equally well in support of the well-known rotary theories for the formation of hail.

OZONE.—We read that M. Thenard makes bold to doubt the commonly accepted medical theory that there is ozone in the air. Its presence in our atmosphere is determined, he says, by the change in the depth of color of prepared paper; but, after all, it is not known that there are no other substance in air which can effect the paper in the same way. By passing a current of air through a gas blast, Wittman obtained air which acted on prepared paper as ozonized air does; while, however, this air disinfected putrid water without rendering it acid, ozone, so it is stated, did not disinfect it, but turned it acid. Moreover, it is known that ozone cannot exist above 200 degrees, and yet the air modified by Wittman's method had been exposed to the temperature at which glass softens. Although he is not prepared to deny the possible presence of ozone in the atmosphere, M. Thenard holds it rash to regard as proved what is still vague and uncertain, and perhaps dangerous. These views of M. Thenard have led to considerable discussion, alike from their novelty and importance.

THE CLIMATE OF INDIA.—In an official dispatch to the Marquis of Salisbury, Secretary for India, addressed to the Governor-General of India in Council, the following passage occurs: "It must be for some time doubtful how far the meteorological phenomena of the last 12 years are to be taken as a fair sample of the climate of India. But in any case it is evident that the protection of the people of India from the effects of the uncertainty of the seasons will constitute in the future no inconsiderable portion of the work of the Government. It is, therefore, a duty to collect with the utmost care all information which may assist future administrators in the task of limiting the range or mitigating the intensity of those calamities. A commission, constituted of three or five of the most competent persons your Excellency is able to select, will be the most suitable instrument for conducting this investigation. It should consist of men who have not taken any active part in the labors or controversies of the past year, and it is desirable that it should include at least one native commissioner."

NUTRITION OF THE EYE.—According to the *London Lancet*, the most interesting discovery of the year in physiology is that made by Boll, that the retina possesses in health a peculiar red color, which is constantly being destroyed by the influence of light, and is as constantly being regenerated by the ordinary processes of nutrition. The "vision red," or "erythropsin," as its discoverer names it, attains its maximum after a night's rest and sleep, or when an animal has been kept for some hours in darkness; it is soluble in solutions of the biliary acids and in glycerine, and probably plays a part in the production of the red reflection from the fundus of the eye seen on ophthalmoscopic examination, as well as in all probability in the ordinary acts of vision.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

RICH ORE.—*Chronicle*, Feb. 16: We learn that very rich ore was struck in the Advance mine, at Monitor, last week—some assaying over \$2,000 a ton, and five other assays averaging over \$400 a ton. If this company will settle its domestic troubles, pay its debts, and proceed with the development of its mine, it would soon have a paying one.

POSTPONED.—The sale of the English mines here have been postponed till March 16th. We trust that by that time Manager Chalmers will have arranged matters so that the companies will save their property. If not, we want to see this valuable property fall into the hands of a San Francisco company.

AMADOR.

A LARGE NUGGET.—*Dispatch*, Feb. 23: Just before going to press, Mr. Zach. Kirkwood stepped into our office and showed us a chunk of solid gold, worth a little over \$61, which he picked up on his ranch near town, it having been uncovered by the late heavy rain. He also picked up as much more in smaller pieces. There was much more picked up by his neighbors.

BUTTE.

THE BUTTE CREEK MINES.—*Record*, Feb. 23: We met Mr. Shepard, the Superintendent of the Butte Creek ditch, the other evening, who reports that the work of construction is progressing as favorably as the weather will permit, and that he will have living water on Butte creek mines by May or June. The storms have not materially damaged that portion of the ditch already constructed. He reports the Hupp claim as having plenty of water and making excellent runs.

CALAVERAS.

HOISTING WORKS AT THE HUGHES.—*Chronicle*, Feb. 23: We understand that the Hughes Bros., owners of the quartz mine, near the Junction, are intending to put up new hoisting works in the place of those destroyed by fire last week. In fact, work has already been commenced, and the boys expect to have their new machinery running in a couple of weeks. The fire destroyed the timbers for about 20 feet down the shaft.

MAN HURT.—A miner named Cocken, at work in the San Bruno, at Mosquito, was quite badly hurt, Thursday, by the bucket falling upon him. He was severely bruised, but not seriously injured.

DAM CARRIED AWAY.—The Lodi water company's dam, across the Mokelumne river, at Westmoreland's bridge, is carried away. If the report is true, it will be a serious loss to the company.

FRESNO.

MILLERTON.—*Republican*, Feb. 23: Hard times have driven many from other pursuits to mining. A company of six has located a claim on what is known as Caside bar, and are working with good prospects. The claim is in the old bed of the river, and will take two years to work out and it probably will prove very rich. Further down the river is Thornton & McCord's claim. They have repaired ditches and are doing good work. A company of nine, owning a claim opposite old Fort Miller, have completed a ditch from the north fork of the San Joaquin, and are now reaping a rich harvest with a hydraulic. The foothills are looking finely and the season both for mining and agriculture promises well.

MARIPOSA.

THE RAIN.—*Gazette*, Feb. 23: Commencing with Sunday last, it has rained almost incessantly since that time up to Thursday morning. The rain has given high tone to the placer mining interest in this section, of which there is a greater amount than the outside world is aware of.

PLACER.

MICHIGAN BLUFF AND VICINITY.—*Argus*, Feb. 23: Col. Keown, at the Hazard mine, is busily engaged in drifting. A tunnel, some 1,700 feet in length, has been run up stream, and the mine is looking well. The Van Emon brothers began washing in their claim, the North American—or, as it is more generally called, the Big Gun—last Monday. The new mill of the Weske is nearing completion, the machinery being mostly all in. It will be worked by steam instead of by water as heretofore. The Hidden Treasure drift claim is now employing a large number of men—the best evidence that could be given of its profitable working. John Bardwell, of Bardwell & Darling, found a boulder on his claim weighing 40 pounds, last week, literally covered with gold. At Last Chance, a mining camp some distance in the mountains above the bluff, the mining prospect is quite encouraging, being better than for a number of years.

DAMASCUS.—The Mountain Gate drift company have struck a new lead in their lower or bedrock tunnel. Two men in one short shift brought out 16 ounces of coarse gold. This is not a mere transient strike, but an evidence of what is considered a permanent, sure thing. The mine is one of the best in the State; it has proved itself so by its yield of the precious metal for over 20 years. There are 21 owners in it. S. H. Gillespie is preparing his claim at

Red Point, two miles above Damascus, for work. A company have located a new claim below A. B. Campbell's, Butcher ranch. A piece of gold was recently taken out there worth \$300.

YANKEE JIM'S.—They are having a splendid season here for water, assuring a long and profitable season for working the hydraulic claims, some of which are being bought up by parties having more ample means than former owners. A trouble here, as in many other districts, is that a few men claim to own all the country, and yet do but little. Until lately there has been no mining done here this season, owing to the Union ditch being out of repair, but it is running now, and will furnish 1,000 inches of water to the mines for the next three or four months.

AT TODD'S VALLEY POND & Co., are running a heavy head of water, and sending the gravel down stream at a rate that will be apt to set the farmers after them.

AT FOREST HILL.—Joseph McGillivray is using 1,200 inches of water, and under his management the Old Dardanelles is assuming the activity of its palmist days. No doubt he will render a good account to his company when he gets through washing next summer. He is running the mines after his own notion, and he is the right man in the right place. Having had a long and successful experience at hydraulic mining. This gentleman was formerly the owner of the famous Ranch and Hydraulic claim in Trinity county, from which in the early days he made a good deal of money.

BATH.—Messrs. Breece and Wheeler are running as usual and their thousand-dollar-a-day claim will yield yet many thousands of dollars. Brown, of Smith's Point, is all ready to run; also Cranage & Co., of the same place. Both of these claims are good ones, and the owners enterprising. They are taking water from the Union ditch and using 500 inches each. The May Fletcher Co., under the Superintendency of Mr. Chappellet, a practical miner, is doing well, and he is sanguine of opening up a first-class mine. This is a new company, the owners being residents of Oakland. The drift mines are doing well. The Sebastopol, near Forest Hill is getting rich gravel and running it through their mill with good results, while the Centennial, one mile south, have struck good prospects. The Hazard company, Col. Keown Superintending, have struck the lead and are taking out \$100 to the tub, and everyone rejoices thereat, for the Colonel had faith and stuck to the mine like a Trojan.

NEVADA.

AT YOU BET.—*Dutch Flat Forum*, Feb. 21: Times are lively since the rains, of which they have had a little too much. The English company at this place have made a good clean-up in their claim. A cave occurred lately in the Hussey claim. Judge Brown, the proprietor of the once famous Brown Brothers' claim, has commenced running a tunnel to tap the mine. The contract has been given to Chinamen at \$3.10 per foot, so rumor says. The rock is hard. A rich boulder has just been found in the Swamp Angel claim. A large rock had become fastened in the sluices, and was allowed to remain until they were ready to clean up. On examining it the rock was found to contain gold in abundance. All of the claims in the district, with but few exceptions, are running. With the increased water supply additions will be made to the working force in the various mines, but this is no reason for miners to rush here, as the home supply will more than accommodate the demand.

QUARTZ MINING NEAR NEVADA CITY.—*Gazette*, Feb. 16: Ebaugh & Lewey, whose quartz claim is near Kitts' mill at Willow valley, are taking out some splendid rock, the last crushing yielding \$2,400, or about \$55 per ton. The quartz mines in that section are looking better than ever before, and the prospects are good for the discovery of many valuable ledges. Previous to the storm a large amount of prospecting had been carried on, which will be continued as soon as the weather is favorable.

PITTSBURG.—*Transcript*, Feb. 20: A 13-inch ledge was developed yesterday on the 800-ft level of the Pittsburg mine. The rock is said to be unusually rich. This mine has heretofore been considered one of the "solid" ones of Nevada county, and now if the strike of Tuesday proves to be what present indications portend, the Pittsburg will be entitled to the banner.

WOLF CREEK.—The heavy rain of Sunday caused the water to rise higher in Wolf creek than at any time since the memorable winter of 1861-2, and as a result the mining sediment which has been accumulating in the bed of the stream for several years was washed out in many places down to the bedrock. At the bridge over the creek at Perrin's ranch the debris had filled in to within eight inches of the bridge, but the flood cut it all away down to the natural rocky bottom. Another effect of the rain was to wash off the soil on plowed ground down as deep as the plow had penetrated, thus carrying away soil and seed. This goes to confirm Prof. Davidson's theory that the washings from agricultural lands under cultivation is an important factor in filling the Sacramento river with debris, as well as mining tailings. With the debris which was washed out of Wolf creek and Bear river on Sunday, a heavy addition has likely been made to the deposits in the vicinity of Wheatland and lower down on Bear river, which has already caused much annoyance to the farmers of that section.

A NICE LITTLE CLEAN-UP.—Sixteen loads of rock from the Centennial mine were crushed at

the Orleans mill last week, and cleaned up \$2,000. The bad condition of roads prevented a large crushing, but the company have more of the same kind of rock on their dump.

EMPIRE MINE.—*Grass Valley Union*, Feb. 22: The Superintendent of this mine, in his letter of the 16th, says: I am able to report a regular well-defined ledge in No. 6 south drift, and the stopes continue to look well, also a fair sized ledge in the raise. The ore in No. 3 north raise is improving as we go up. The wastledge is looking favorable. No improvement in No. 8 south stopes on the Rich Hill ledge, but the ledge in the drift shows a slight improvement. No material change in other parts of the mine.

WATT GRAVEL MINE.—This shaft on this mine, at Moore's Flat, is down 237 feet and still in quicksand. Very little increase of water. All the machinery working well.

The Eureka Lake water and mining company are using 6,000 inches of water at Columbia Hill.

ALASKA MINE.—The bad roads interfered with hauling, and, in consequence, there has been a large accumulation on the dump, which is pronounced, by those who have seen it, as rich, if not the richest dump pile ever seen in Nevada county. It does not run to specimens, but the fine gold is all through it, and in the seams of the rock the granules of gold are in streaks. The north drift of the bottom, or 300-ft level, is producing this rock, the vein running from eight to 20 inches in size.

SIERRA.

DEEP SNOW.—*Mountain Messenger*, Feb. 16: Snow at Gold Lake is reported to be about 10 feet deep. Thirteen feet of snow reported at Bntcher ranch and nearly 22 feet on the ridge between Downieville and Jamison. Five feet at the Buttes mine, and the prospect is that we shall have a heavier body of snow on the mountains than we have had for many years.

CLAMPER DIGGINGS.—Scott & Crooks are running with about four reservoirs a day and washing down considerable debris.

FOREST CITY.—The Bald mountain company have put on another large force of men, which will undoubtedly be increased by the late storms. Everything is now thriving in that mining camp. The North Fork company have begun to wash dirt. The town is filled with people.

MORRISTOWN.—Wm. Perkins made the trip on snow-shoes over this elevated hurg, last Tuesday. He reported five feet of settled snow in that region, and the boys along the high ridges and in the deep canyons are gleeful over the now sure good water season in store for them. Bunker Hill company are taking out considerable gold. Most every one busy at work.

SIKIKYU.

MINERS BUSY.—*Yreka Union*, Feb. 16: Work has commenced in the extensive gravel claims at Orleans Bar, and the present prospects are very flattering. Some dozen men are at work in the Big Bar claim, ten miles below Orleans, which is paying handsomely. In fact the workmen are busy on every stream and in every gulch from Orleans to the junction of the Klamath and Trinity rivers, and are in good spirits over the prospect of the abundance of water for months to come. There are more men mining in the Orleans Bar section and along the Klamath than for many years past. Heavy rain storms with wind have prevailed, and much timber has been blown down.

TRINITY.

DAMAGE.—*Journal*, Feb. 23: High water last Sunday tore the blocks out of 50 or 60 boxes of I. Woodhury's flume; carried off Hupp & McMurphy's flume across East Weaver creek back of B. B. Rules' residence; upset and demolished a building belonging to Wm. Todd; and filled about 100 boxes of the Weaver Creek company's flume, besides doing considerable lesser damage in the basin.

FROM DEADWOOD.—Mr. G. F. Diener was in this week and tells us that Trotter & Co. are getting more rock from the mine to the astrata and will begin crushing again next Monday. The ledge is three feet wide. Also that, Frick & Davis are pushing their tunnel ahead, and that Geo. Kline is crushing rock for Phillips Bros.

Nevada.

WASHOE DISTRICT.

CON. VIRGINIA.—*Gold Hill News*, Feb. 27: Daily yield, 600 tons of ore. The ore stopes going south on the 1650-ft level are looking finely, the ore in the face still being of a very rich character. The preparations are now pretty nearly completed for extracting the large bodies of rich ore yet in reserve on the 1500, 1400, 1300 and 1200-ft levels. On the 1850-ft level the south drift from the California has now penetrated into the Con. Virginia mine, and is to be pushed steadily forward until it connects with the joint winze just started on the Best & Belcher line. That will open a splendid base for crosscutting and ventilating that entire level. The upraise on the ore vein from the 1750-ft to the 1650-ft levels is completed, passing nearly the whole distance upward, half in the west rock and half in rich ore. This very curiously shows the ore to extend from the 1650-ft level more than half the distance to the 1750-ft level almost perpendicularly, and then to take a regular dip of 45° to the eastward. Sinking the C. & C. shaft is also making good headway. Repairing the Consolidated shaft is going ahead as usual.

CALIFORNIA.—Daily yield, 600 tons of ore. The ore-producing sections of the mine are

showing well in every part, from the 1500-ft down to the 1750-ft level. The ore continues rich in quality from all the stopes, and especially may this be said of the immense body of ore lying between the 1600 and 1650-ft levels. This body of ore, in richness, has had no equal in the mine, and as yet has hardly been touched. On the 1600-ft level crosscuts Nos. 5 and 4 have been connected with the lateral drift east of the ore vein, considerably benefiting the ventilation of that portion of the mine. The mills have all been kept running and doing splendid work, with the exception of the Mariposa, which was stopped on account of the roads being such that it was impossible to keep it supplied with ore by team.

JUSTICE.—Daily yield, 90 tons of ore, which is being hauled to the Pacific mill. It is the intention to commence hauling ore to the Overman dump, to ship to the Santiago mill on the Carson river, the 1st of March. The Santiago has a crushing capacity of 120 tons per day. The ore stopes from the 1150 up to the 800-ft level, wherever they are being worked, are yielding good ore. Two new ore discoveries have been made in the mine during the week. The first was in the west ledge, 50 feet above the 800-ft level and 120 feet north of the Silver Hill line. The ore here is rich in both gold and silver, some of it assaying up into the thousands. The other was made in the south winze, 60 feet below the 800-foot level, at a point 320 feet from the south line, and so far as yet traced is one of the finest displays of rich ore yet made on the Comstock. The ore is rich black sulphurets, the seams coated and filled with stephanite and native silver, mixed with an occasional beautiful ruby silver and quartz crystallization. Choice samples of this ore assays from \$5,000 to \$25,000 per ton.

SIERRA NEVADA.—Another winze has been started on 1200-ft level, some 400 feet further south, which is now down 25 feet, following the dip of the west clay of the vein, which at that point has a dip of 60°. A donkey hoisting engine has been erected at the winze, and the sinking is being pushed forward with great vigor. On the 1700-ft level this east crosscut some days since penetrated into hard porphyry, was stopped, and a diamond drill placed in the face.

SILVER HILL.—On this 800-ft level, at a point 259 feet east of the main incline, a switch has been put in and a drift started southward to reach and prospect the ledge under the point where the rich vein of ore was found on the 600-ft level.

JULIA CON.—This east drift from the winze on the 1800-ft level is steadily advancing in quartz and porphyry, mixed with occasional spots of ore. This drift will in a very short time have reached a point directly under the Ward shaft, when an upraise will be at once commenced, to connect with the shaft. When that is done, the ventilation of the two mines to the depth of 1,800 feet will be complete and a favorable basis for future deep working laid.

MEXICAN.—The east drift from the bottom of the joint Ophir winze on the south line, on the 1900-ft level, is being pushed forward with all the vigor possible. It is very desirable to complete an air connection between this winze and the north lateral drift on the 1900-ft level at the very earliest day possible, as that will then enable the crosscutting of the ore vein on that level.

SENATOR.—The Sutro tunnel having reached the eastern boundary of this mine, the Senator company will commence the exploration of their mine as soon as the most eligible point is reached.

NORTH CON. VIRGINIA.—The west drift on the 1300-ft level is being pushed steadily ahead toward the Union Con. ground, the face still in very soft, favorable material.

SAVAGE.—The water is reduced some 65 feet below the 2000-ft level, at which point it is being held, while every exertion is being put forth to repair the crosscutting drifts with the Hale & Norcross and Gould & Curry mines on the 2000-ft level, the heat being so great that little can be done below the 2000-ft level until ventilation is obtained at that level.

BEST & BELCHER.—Sinking joint winze on the Consolidated Virginia line is making the best of progress. It is now down 28 feet, the bottom in good blasting ground. This winze is to be sunk perpendicularly to the 1900-ft level.

HALE & NORCROSS.—The water is now reduced 60 feet below the 2000-ft level, and is now under easy control of the pumps.

SOUTH COMSTOCK.—Some small streaks and hunches of ore, giving good assays, have been met with, during the week, at the 500-ft level, near the west ledge, which are evidently feeders of the vein itself.

OVERMAN.—A personal examination of the quartz vein on the 1400-ft level, and in the winze below that level, enables us to say that there is a steady improvement in the make, regularity, dip and character of the ore vein from the 1300-ft level to the bottom of the winze, 160 feet on the inclination of the ledge below the 1400-ft level, that seems as if it could hardly help making into paying bodies of ore at no very distant day. The east drift on the 1200-ft level is also making good progress, having penetrated over 40 feet of solid, healthy quartz of as fine a make as there is on the ledge. This body of quartz or low-grade ore lies 600 feet or more to the eastward of the shaft, and has in all probability never yet been reached by any of the openings on the 1400-ft level.

UTAH.—The face of the east crosscut on the 1150-ft level is passing through a much more favorable character of soft porphyry.

OPHIR.—Sinking the main incline is being pushed, with the flow of water giving no trouble. The south drift east of the vein at the 1900-ft level is making good progress, the face still in very favorable vein material. The joint California drift at the 1700-ft level is rapidly approaching a point directly over the course of the new ore vein.

BELCHER.—Sinking the pump and drain shaft is making steady progress, the bottom in hard blasting ground. Sinking the south winze from the 1900-ft to the 2160-ft level is making good progress. The connection of the east drift from this winze with the main south drift at the 1900-ft level has greatly improved the ventilation of the mine on that level. The east drift on the 2160-ft level is passing through fine quartz, some of which gives good assays in both gold and silver.

YELLOW JACKET.—The main drift east on the 2200-ft level, having reached a point directly under the new shaft, an upraise from it can be commenced whenever deemed expedient.

GOULD & CURRY.—The main incline is connected with the upraise from the 1900-ft level, and the upraise is being enlarged and timbered with all the speed possible.

CHOLLAR-POTOSI.—The Chollar-Norcross-Savage shaft is down 1983 feet. The flow of water amounts to about 15,000 gallons per day.

CROWN POINT.—A drift south is being run on the 500-ft level to prospect some portions of the mine passed by in years past, to see if ore could not be found with which to keep the mill going.

CALEDONIA.—The water has been drained and work resumed in both drifts on the 1600-ft level.

BALTIMORE AND AMERICAN FLAT.—The developments on the 1400-ft level are making steady progress, the face of the north drift being still in quartz carrying spots of good ore.

SUTRO TUNNEL.—Total length of tunnel, 19,030 feet. Average rate of progress, 7½ feet per day. The face of the header is in fair working ground, with but a very moderate flow of water. Temperature of the air at the header, 108 degrees.

BELMONT DISTRICT.

NYE COUNTY MINES.—*Courier*, Feb. 23: The Alexander mine, at Grantsville, shows an 18-foot body of rich chloride ore. Company ships, every 10 days, 1,300 to 1,500 ounces silver, and expect to increase the same soon. Rock from the "1876" lode, Jett district, gives average assays of \$141 per ton. The Belmont company make good progress in north drift on 600-ft level, where they have a seven-foot, well defined vein. El Dorado South have mine opened to a depth of 1,000 feet and are pushing exploratory drifts on different levels, that on the 900-ft level being in good ore. The Tyho Con. keep up their regular bullion shipments at the rate of about \$90,000 per month. The mine looks well and improves under deep exploration. Doubts are entertained about the air-jacket furnace, put up at Lodi, extending the test, as the copper plate soon burn through. A 30-ton brick furnace will be erected there in May next.

CENTRAL DISTRICT.

TAKING OUT ORE.—*Silver State*, Feb. 26: From the Golden Age quite rich and from the Locomotive pay ore are being taken out in considerable quantities. Much mining machinery for the Tuscarora district is arriving at Winnemucca, to be shipped in from that point.

EUREKA DISTRICT.

ORE IN CAVES.—*Sentinel*, Feb. 24: In a cave at the Richmond mine, rich ore was discovered encrusting the roof to a considerable thickness, a fact that has never before occurred in any of the numerous cavities in the limestone opened on the hill, ore being found on the floor or sides, but never, until the above, in the upper part. Miners are of the opinion that all of the ore bodies found in the lode were at one time caves in the vein matter, afterwards filled by nature's processes, and that the work of deposition, by percolation and infiltration, is still going on. Some color is given to the theory by the invariable presence of rich ore in the openings of the vein formation.

INDUSTRY.—A large body of carbonate ore has been struck in this mine, assaying from \$300 to \$400 per ton and carrying but little lead.

Arizona.

THE "76" MINE.—*Citizen*, Feb. 15: The shaft in this lode, situated near the Silver King, now down 100 feet, is to be sunk another 100. From the drifts already run good rich antimonial silver ore has been extracted.

GLOBE DISTRICT.—Half a ton of silver ore from the Mexican lode, assaying at the rate of \$528 per ton, has been shipped to San Francisco. The mine is considered a good one, though condemned by San Francisco experts. From the Stonewall mine, 12 tons of ore worth \$17,000 per ton have already been sent to San Francisco, besides which 100 tons, averaging \$500 per ton, have been reduced at the mine. Another shipment of rich ore is about to be made. The mine is looking well in all its parts, and promises to make an enormous yield of bullion in the future. The Little Mac, the Democrat, Hannibal and Robert E. Lee mines, lying near the Stonewall, are all considered valuable properties.

RICH FIND.—*Miner*, Feb. 15: Two Germans have just discovered a silver-bearing ledge, yielding ore that assays over \$3,000 per ton. The locality is in Superstition mountains, Maricopa county. The McCrackin mill, 20 stamps, and the Signal, 10 stamps, reduce between them about 90 tons of ore per day, and are making money.

PECK MINE.—*Arizona Enterprise*, Feb. 16: Mill running an high grade ore, and work on the shaft being pushed, both to explore the mine and obtain more water, of which they have only enough to run the mill a portion of the time. On the Tiger mine work advances rapidly. North tunnel in 100, and the south 140 feet, with ore in the latter.

VULTURE.—A portion of this mine, with mill, water rights, etc., has lately been sold. The new owners will increase the capacity of the mill, and make other improvements that will probably bring it back to former prosperity. What seems a valuable ledge has just been found in the Lynx district. The Masterson mill is running on rock from the Black Warrior, in Bradshaw mountains. The Tiptop mill has been started up with ore enough on the dump to keep it running for two months. The Swilling company are sacking ore for shipment. The Fey is looking well. Several shafts are being sunk on the Red Bird.

GILA CITY MINING DISTRICT.—*Arizona Sentinel*, Feb. 23: This is a new district, situated 16 miles east of Yuma City, and comprises an area of 16 miles square. It was organized February 6th, 1878, since which several promising discoveries have been made. Across the river near Les Flores a couple of gold veins are being worked by Kelly, McMeiken, and others, of Gila City; also Rachel, a silver-bearing vein, by the same parties. The Effie mine presents a promising appearance. At the surface its width is nearly three feet, and it is found to widen in sinking. It has an almost easterly and westerly direction and can be traced for a distance of 500 yards. The American Eagle vein averages from eight to ten inches in width, and carries a rich copper ore containing silver. It has a north-westerly and southeasterly direction, with every appearance of a well defined ledge. An assay showed copper to the amount of 30%. Most of the silver ores here carry copper. A company has been organized here called the Gila City gravel mining company. They are engaged in sinking a shaft, 5x10, to the bedrock. In case much water should be encountered, an engine and steam pump will be in readiness to do service. This water will be used in sluicing the pay gravel from the gulches which are in close proximity.

On the Buena Vista, situated 20 miles above Yuma, work has been resumed after a long intermission. Several shafts were put down on this lode many years ago, and ore taken out that milled \$30 per ton, a five-stamp mill having been put up on the mine. But the former owners became peculiarly involved, and were obliged to abandon the property to their creditors, one of the two owners having since died.

A NEW MILL.—A five-stamp mill is about to be put up for the Pinel Con., near Picket Post, site of the Silver King mill. It comprises all the latest improvements, and has power for 10 stamps, pans, etc., so that its capacity can be increased at any time. The present intention is to crush and concentrate ores for shipment, the mill being provided with two Frue helts, like those in use at the Silver King mill. An improved ore feeder supplies the battery. The boiler has been especially constructed for burning the dry, silicious wood of Pioneer district. Instead of the hot draft employed for many improved boilers, a fine jet of steam will be let into the fire. A contract has been made for crushing 2,000 tons of ore from the Wana Whata mine. The mill is being introduced for custom work entirely. Eleven hundred pounds of the rich concentrations from the Silver King dump passed through Yuma, lately, on the way to San Francisco; also 7,697 pounds of rich ore from the McMillan mine, worth about \$10 per pound.

AN OLD DISTRICT REVIVED.—Silver district lies on the Colorado river to the north of Eureka and Castle Dome districts. It was organized nearly 15 years ago by Col. Snively, the discoverer of gold at Pinos Altos. But as no gold was found there it was practically abandoned, as were the other districts just named. A number of ledges of argentiferous galena were located, and some work done; but as there was then no market on the Pacific coast for lead ores, and no apparatus in this country for their reduction nothing could be done with them. The principal ledges are true contact veins, between a white granite and slate. Late rains have filled all the tanks with an abundance of water, and started vegetation enough for prospectors' animals. The mines are within a few miles of the river, giving them a great advantage over those of Castle Dome in the matter of transportation to reduction works or to market. Lately some prospectors have visited this district, and finding much good ore on the old dumps, have made locations and settled to work.

Colorado.

THE GOLDEN AGE.—*Courier*, Feb. 22: Mine now about 100 feet deep. Ore continues of good quality and increases in quantity, the body varying from three to four feet in width, all milled as it comes from the mine. Four teams are kept hauling to the 10-stamp mill, and eight men break down enough ore to keep the mill running night and day. Bunches of coarse free gold in white quartz, which have been found all the way from the surface, still continue to appear with usual frequency. The ore goes \$30 to \$50 to the ton under stamps; and as soon as the owners shall have gotten their other 15 stamps in place, there will be a large and steady flow of bullion from the mine. THINOS lively around the Smuggler mine, at Balarat. Leasers are busy taking out good pay from all parts of the workings and from the

dumps. A rich strike was made in the bottom of the main shaft, last Saturday, showing about four inches of solid tellurium. This property properly managed would rank with the best.

THE "CHINNEY" in the Mountain View is proving to be one of the best in the county. Ore shipped regularly. Last shipment netted over \$3,000, while it cost only about \$100 to take it out.

A RICH strike has been made on the east part of the Bohtail lode, Gilpin county, from other portions of which a great deal of bullion had previously been taken. Two hundred thousand tons of coal, worth \$800,000, were mined, last year, in this State.

Idaho.

ITEMS.—*Avalanche*, Feb. 23: Rumored rich strike in lower levels of Golden Chariot. Much \$200 ore taken from Potosi of late. Sinking on Black Jack, ore hauling and a good deal accumulated at Leoard mill. Clearbrook looking well and contract let to open up 50 feet. Two mills to go up soon at Falcou, and mines looking well.

ATLANTA.—Buffalo company are running their mill and taking out about \$1,000 per day. Work six hands at the mine and haul 10 tons of quartz a day from the mine to the mill. The Monarch company running mill and work a few hands at the mine, but are not hauling any quartz this winter. Several other mines are being worked in Atlanta on a small scale. Newton's company are prosecuting their work on the Last Chance mine with a force of nine men. Mine yielding as well as it ever has. They pounded out in a mortar, a few days ago, between \$500 and \$600 from 13 pounds of rock. The rock selected for milling goes from \$50 to \$100 per ton.

Montana.

THE MINES.—*New Northwest*, Feb. 15: The Trout company have struck good ore at a depth of 329 feet. The Northwest company have a fine body of argentiferous blende and native silver in their lowest level, and are turning out much bullion. The Hope company is doing equally well. Work is pushed on the Algonquin, with plenty of good ore in sight. The Hecta company have resumed work with one furnace. The present difficulty of getting ore from this mine to smelting works will be obviated next winter, by the construction of an elevated tramway. The Mallory mill, at Pony, runs on custom ore. Lately shipped 240 ounces gold bullion, proceeds of 175 tons Willow Creek ore, which mine has nine feet of rich ore. Other mines looking well. The Lexington, which has 18,000 tons of ore in sight, is turning out a large amount of silver bullion. The machinery for the La Pieta mill is being brought in, and will be put up at Butte in the spring.

Oregon.

A NEW MINE.—*Bedrock Democrat*, Feb. 13: A prospect run of ore from the White & Hoffman, on Burnt river, yielded \$12.50 per ton. The ore, when the machinery is in good working order, will yield \$18 per ton. The prospects throughout the mining regions of eastern Oregon were never better than at present.

Utah.

BIG COTTONWOOD.—*Salt Lake Tribune*, Feb. 24: The Carbonate, Carioco, New York, Mammoth and Dolphin mines are all being worked. The Goodspeed & Reed tunnel, in over 800 feet, will tap the Reed & Benson at a great depth. The Antelope and Prince of Wales are yielding considerable ore, but cannot ship on account of the snow. Two rich strikes have been made in the Prince lately.

PARK CITY.—The Flagstaff shaft is being sunk unceasingly. The Ontario mill has been shut down all week, a new Stedefeldt furnace being about to be built. Ore houses full, and no work being done in the mine, except on the 500-ft level. The McHenry mill is to be placed in running order soon. Some fair grade ore is taken out of the Hawkeye tunnel.

ALTA.—The North Star yields 50 tons of ore monthly. Regular shipments are made from the Highland Chief. The Savage mine is worked under lease, and is doing well. The vein has been cut lately in the Equitable tunnel. A new strike is reported from the Wellington. The Kate Hayes makes frequent shipments of high grade ore. The Sedan, Green Mountain Boy, Alpha, and many other mines in this district are being worked with good results. The Alta Con. ships over 300 tons a month, and gives employment to 25 men. The Frederick tunnel is being driven ahead rapidly. Six men are at work on the Emily mine, getting ready to make ore shipments. A small vein of high grade ore in the McKay mine. The Lavina, or Grizzly, works 20 men. Plenty of ore in sight, and will commence to ship soon. The camp never looked better than now. The tramway runs down about 250 tons a day when the road is open. The Bay City tunnel raise is nearing the old works. Ore reported struck in the raise, but how much or what grade we are unable to learn. New strike of rich ore reported in Nahob. Ore in Toledo shows up well. Vein is from six inches to four feet wide. Are making regular shipments. Flagstaff works about 100 men, and sends down over 100 tons of ore daily.

SAN FRANCISCO DISTRICT.—The Godhe smelter runs regularly on horn silver ores. The Bonanza Co. run three stacks on their own ores. The Cerro Gorda looks well. Twenty-six men work on the Horn silver. Output, 90 tons per day. Mahoney Bros. have a good property in the Shert.

News in Brief.

A CARRIAGE makers' union is being organized in this city.

ALLMAN's charges against Postmaster Coey are by the Department considered unfounded.

The large commercial house of Merado & Blanca of the city of Mexico has failed.

A MOVE is on foot looking to the improvement of the North Beach water front of this city.

WILLIAM WORKMAN died at Montreal lately, leaving about \$400,000 to charities in that city.

THE Pennsylvania Legislature have appropriated \$710,000 to defray expenses of suppressing the July riot.

CALIFORNIA is not alone in her floods. They are having heavy freshets in the New England States and Canada.

THE schooner *J. H. Roscoe* has returned from Cocos island, reporting disappointment in the search after treasure.

THE churches are still relieving distressed persons in this city by giving free meals to those in want.

THE Senate in Maine has indefinitely postponed the bill to give women a right to vote in municipal elections.

JOHN RUNK, the murderer of police officer Coots, has been sentenced to be hung on March 29th.

DR. CARVER, the shooting expert, broke 885 glass balls out of 1,000, in a match at Oakland, last week.

GEN. CROOK anticipates no trouble from Sitting Bull, and does not contemplate any expedition against the hostile Sioux.

REDWOOD CITY was flooded the other day for a couple of hours, the first time such a thing has ever occurred.

DISORDERLY meetings have been held in London, and conflicts are reported between peace and war sympathizers.

AFTER an interruption of eight days, caused by the storms, railroad communication between this city and Los Angeles has been resumed.

THE Austro-Hungarian ministers have authorized the government to ask the Delegates to issue a loan of 60,000,000 florins.

THE House Committee on Pacific railroads have directed a favorable report on the bill to extend for 10 years the time for the completion of the Northern Pacific railroad.

TWENTY-SIX thousand miners at Aherdare have agreed to accept the 5% reduction of wages asked by the masters until the price of coal rises.

By the proposed transfer of the Indian Bureau from the Interior to the War Department, it is claimed that the cost of caring for the savages will be reduced from \$23.05 to \$4.28 per capita.

JOHN MCTOUE, formerly of Virginia City, where he leaves a large family, was killed at Lead City, Black hills, a few days since, by Ben. Wadsworth.

IN January, a mat shed, at Tientsin, China, in which were collected many people from the famine districts, took fire and 1,400 women and children were burned to death.

JOSEPH A. CORPORA, of the regular police, was shot by his wife at their residence, in this city, on Monday night last, producing death a few hours after.

AN SAM, the Chinese murderer of three whites, at Rocklin, last summer, was arrested in Plumas county, last week, by John Boggs, but committed suicide by shooting himself.

MANY people in Nevada are dissatisfied with the hanging of Rover, executed last week, for the killing of Sharp, at the Humboldt sulphur mines, two years ago, they being of the opinion that he was innocent, as he maintained to the last, or else insane, of which latter he also gave some evidence.

THE freight capacity of the Government ships *Constitution*, *Supply* and *Wyoming* being insufficient to accommodate the goods offered for the Paris exposition, the ship *Portsmouth* has been placed at the disposition of Commissioner-General McCormick. All the space in the American department has been assigned.

THE famine in China has assumed colossal proportions. At Tientsin, the later part of December, there were over 90,000 refugees from hack districts, who were dying by hundreds. The famine in India also causes much suffering, and is likely to continue for several months yet.

MELVILLE ATWOOD, of the Mineral Committee of the Paris exposition, says that it was his fault that publicity was given to J. W. Mackay's offer to defray the expenses of his department of California exhibits. The offer was made with a request by Mr. Mackay that his name be kept secret.

THE Secretary of the Treasury has issued instructions for discontinuing the receipt at the San Francisco and Carson Mints of deposits for return in trade dollars, and that deposits heretofore made be settled for in that coin on satisfactory evidence being furnished that the same will be exported; or, if preferred by depositors, they may receive their silver back in fine mint bars.

It is estimated that the damage caused to the country about and below Sacramento, will amount to nearly \$7,000,000, apportioned as follows: for rebuilding levees, \$2,000,000; loss of crops, \$3,000,000; probable destruction of orchards, \$500,000; injury to buildings, \$500,000; loss of personal property of various kinds, \$200,000; loss of cattle, \$20,000; destruction of pasturage for those saved, and cost of transporting them to high ground, \$125,000; fences swept away; \$100,000; boarding homeless families, \$50,000; loss of rents to land owners and debt owed merchants, \$500,000.

Divisibility of Gold.

At a recent meeting of the State Geological Society, Mr. Henry G. Hanks read the following paper on this subject:

Having recently had occasion to refer to statistics showing that gold coin loses an appreciable amount even in a single handling, and being desirous, in connection with my investigations, to examine microscopically the gold dust resulting from such abrasions, I asked Mr. L. A. Boynton, of the United States Treasury of this city, to crush out the wooden tray in which large sums of gold coin are daily handled, and when he had accumulated sufficient to see the gold, to send it to me. He kindly complied with my request, and I am able this evening to call your attention to some interesting facts, which have developed themselves in the examination.

I have prepared a slide for the Society's collection, in which the gold is mounted dry, after first partly removing the impurities with which it was mixed. It will be seen, however, that there still remains coal, sand, fibers of wood and cotton, hairs, etc. In washing out the extraneous matter, the finer particles of gold floated on the surface of the water, and I found it impossible to cause them to sink, although I tried every plan I knew of. This experiment would seem to prove the truth of the oft-repeated statement of miners, that much free gold escapes them from this cause.

On examining the slide under the microscope, it will be seen that the gold is invariably in the form of scales, and much resembles the natural gold scales found in the beach sands at Cape Blanco, except that in the latter the edges and face of the scales are rounded by attrition in being washed about by the waves.

It has been a source of wonder to gold miners that nearly all placer gold is found in flat pieces. Some ingenious theories have been advanced to account for it. The sample I present this evening would seem to indicate some law which governs the form of fragments. I admit I cannot clearly understand how rounded masses of metal like gold coin should react on each other mechanically and produce flat fragments, as shown in the specimen.

To give an idea of the size of the particles of gold, I have measured some of them in decimals of an inch, and I find them to vary from .003x.001 to .0425x.0235.

I have also measured a large number of the gold scales from Port Orford, and find an average of .0095 in diameter by .00384 in thickness.

The samples were washed from the beach sands found a few miles south of Cape Blanco, on the coast of Oregon. Ten of the scales, selected at random, and melted into a button, weighed .0021327 grammes. From this weight I have calculated the number of such scales which would be required to make up the weight of an ounce Troy.

If I have made no mistake in my figures, the number should be 142,468, and yet these gold particles are large as compared with those usually found in quartz.

In collecting gold from quartz by amalgamation, it has been found that, in most parts of California, any mine producing rock that will yield, by simple milling process, \$10 to the ton of 2,000 pounds and in sufficient quantity to keep a mill constantly running, will pay well to work.

Most of the best paying mines in California do not produce rock in which gold is visible to the naked eye. It requires long search to find a piece of rock showing free gold.

When the tailings of a quartz mill are examined microscopically, the importance of reducing the ore to a state of extreme fineness will be apparent, for if gold is not absolutely free it cannot be collected by mercury.

Recent investigation naturally leads to the opinion that gold in a state of extreme division is omnipresent in the earth's crust. T. Sterry Hunt, in his work, "Chemical and Geological Essays," quotes Sonstadt to show that the sea water on the British coast contains, beside silver, gold in solution, estimated by him to be about one grain to a ton of water. Mr. J. Cosmo Newbery, Chemist of the Geological Survey of Victoria, Australia, has made some very interesting investigations bearing on the divisibility of gold. He found that the water in certain gold mines contained gold. The timber used to support the mine was carefully assayed and in nearly every case was found to contain gold. R. Brough Smyth, Chief of the Survey, came to the conclusion that the gold was precipitated from solution.

Mr. Newbery had reason to believe, from examination of specimens, that gold was being deposited in many mines. He thinks, however, that finely divided gold is held in suspension in mine water, but not in solution. A sample of mud deposited from mine water of a mine, on Hasler's line of reef, Sandhurst, was examined by careful washing, and the heavier particles were found to consist of auriferous pyrites and free gold. The particles of gold were large enough to be recognized by the microscope. They were in irregular flattened grains.

Dr. Oxland, who was formerly Manager of the Borax Lake company's works, has given a very interesting account of the deposition of gold with cinnabar, free mercury, sulphur, boracic acid, silica, etc., at the sulphur hanks situated on the margin of Clear lake.

He says: "These phenomena present indubitable evidence of the volatility of gold and silver, mercury and iron, in presence of aqueous

vapor, associated with sulphuretted hydrogen, carbonic acid and horacic acid."

Some years ago, in Calaveras county, an old furnace—used in roasting pyrites preparatory to treatment by chlorination—was torn down and the roof was found to be coated with gold. A specimen is preserved in the museum of the University of California. Here is proof that gold is volatile at a comparatively low temperature. It has long been known that it is volatile at a high temperature and advantage is taken of this fact in the purification of platinum.

On the Pacific coast, gold is found in the most unexpected places. There is scarcely a formation which does not contain gold in greater or less quantities. It is also found associated with minerals not usually considered its associates.

To illustrate this fact, I have brought, for inspection, several remarkable specimens:

1. Gold in pyrolusite.
2. Gold in staurolite.
3. Gold calcite. In this specimen the gold is deposited on the wall-rock of the mine, apparently by the same agencies which deposited the calcite.

4. Gold on pyrites. It will be remembered that I exhibited a similar specimen at a former meeting, and called attention to the globules of gold, which seemed to be squeezed out of the crystals of pyrites, or to have been deposited on their surfaces in a manner not easily explained. The specimen I have brought this evening is more remarkable than those formerly shown.

I have long believed that the gold in sylvanite, nagyagite, calaverite and other telluric minerals, was a mechanical mixture and not chemically combined. Experiments I have made from time to time have convinced me that my opinion was correct. I have prepared a specimen of telluric gold, from Sunshine, Colorado, which is worthy of your attention. You see that the gold is in a state which would preclude the idea that it had been chemically combined with the tellurium, in which case the gold would have been an amorphous powder rather than the semi-crystalline form shown. The specimen has been repeatedly boiled in nitric acid, by which the tellurium has been dissolved.

It must be admitted, from the experience of the last 25 years, that gold exists in minute quantities in many rock formations, which will not pay to work. On the other hand, many mines, which will scarcely pay at the present time, will become productive as our quartz milling machinery is improved. Much gold is lost in California by unskillful milling.

Although the modern quartz-mill is a marvel of mechanical skill and ingenuity and does its work rapidly and well, yet it has not reached perfection. The problem for the future inventor to solve will be to construct machinery which will reduce the rock in an impalpable powder, to set the gold free and to collect it without mechanical loss of either gold or mercury.

The Black Hills.

Where They Are—How to Get There.

We are constantly in receipt of letters from parties in various sections of the country, seeking information concerning the new and wonderful territory, its past, present and probable future; conditions of society, means of ingress, etc.; and as to answer each and every one would keep a correspondent in constant employment, we have prepared the following brief statement, which may be relied upon as correct:

The Black Hills are located 200 miles north of the Union Pacific railroad, and are reached from Chicago via the Chicago, Burlington and Quincy, the Chicago, Rock Island and Pacific, or the Chicago and Northwestern railroads from Chicago to Omaha, 500 miles; the Union Pacific railroad to Sidney, 414 miles, or to Cheyenne, 516 miles, thence by a first-class stage line to Deadwood and principal camps in the Hills. Time necessary for a trip from Chicago to Deadwood, four and a half days. Fare, \$49.25, first-class. By this route but two changes are made between Chicago and destination—at Omaha and Sidney or Cheyenne. Accommodations, including the stage lines, are unsurpassed. Another route is via the West Wisconsin, or the Chicago, Milwaukee and St. Paul lines to St. Paul, and the St. Paul and Pacific and Northern Pacific to Bismarck, from whence a tri-weekly line of coaches depart for Deadwood, distance, 250 miles. Time by this route, six days from Chicago; fare, \$49.25.

Deadwood is the most westerly mining camp in the Hills, of which it is the metropolis, and is located eight miles from the foothills, at the confluence of Deadwood and Whitewood creeks. The gulch proper contains a population of about 4,000 people. The city, for a mining camp, is substantially built, and is daily improving. Business of all kinds is well represented, and society will compare favorably with any mining town in the West. We have two churches, school houses, two daily papers, telegraph, two daily mails, excellent hotels, and business houses of all kinds. We have no municipal government at present, but steps have been taken for the establishment of a corporate city. At present we are under the exclusive dominion of county officials. The mining interests of Deadwood City are exclusively placer, and are of the richest quality; but recent quartz discoveries upon Spruce gulch, two miles south, and Elk creek, 20 miles southeast, with the already famous silver district known as the Bear Buttes, and the gold region of

Strawberry gulch upon the north and east, renders the city a direct central point. Four miles west lies the wonderful cement belt, upon which are located the most thoroughly developed gold quartz mines in the Hills. Central City, South Bend and Gayville upon Deadwood, and Lead City upon Gold Run, are the other principal camps in this section. Their interests are chiefly quartz mining and milling, albeit their placer claims have yielded handsomely for two seasons. In the districts named there are at present upward of 40 mills, or 600 stamps in constant operation, day and night, a number that is being daily increased. The ore pays from the surface down, and at an average of about \$12 per ton, and as it can be mined and milled for one-half that sum, the profits may be easily computed. Land is far from all being taken up, locations being made every hour in the day, besides which valuable property can be purchased at reasonable rates, owing to the inability of many poor miners to work it.

The Bear Butte silver district is distant about 10 miles, and is equal in richness to any in the world. One smelter is in operation, and others will shortly be erected.

Rapid City, 45 miles southeast of Deadwood, on the Sidney stage route, is delightfully located in a picturesque valley, and has, in addition to large mineral interests, agricultural resources of the very best. Twenty-five miles further south are camps Hayward and Rockerville, in the center of newly discovered, very extensive and very rich quartz, gulch and dry mining districts, where there is abundance of room for thousands of locations, which will undoubtedly be made during the coming season. Still further south lies French Creek, Custer City, and a large mineral district—the southern extremity of the belt—which is idle at present, owing to the fact that claims elsewhere can be worked more cheaply. In a year or so French Creek will be developed, and we predict that when that time arrives the result will astonish "the oldest inhabitant." The climate of the Hills is very salubrious and the health of our cosmopolitan population is surprisingly good. The expense of living here is, all things considered, very reasonable. Hotel rates are \$3 and \$3.50 per day, or \$18 per week, but as all save transient people sleep in their places of business and merely pay \$10 per week for table board, individual expense accounts are comparatively light.—*Black Hills Times*.

The Santo Domingo Mines, Arizona.

These mines are situated in a portion of Yuma county rarely visited by miners or prospectors. They lie in the extreme southeastern part of the county, about 75 miles south of the Gila and close to the Mexican boundary. The Mexicans have lately worked some of them successfully, but as they are on American ground, these miners could obtain no title and took little interest in developing the ledges. Cipriano Ortega, owner of nearly all the good land and cattle around Sonoita, claims to have taken out, from one of these mines, nearly \$14,000 at an expenditure for mining of less than \$100. S. Purdy, Jr., and Arlando Smith returned from down there last week, bringing a couple of hundred pounds of rich specimens—masses of green and yellow chlorides. They had been down there making some new locations and doing assessment work for themselves and on some claims of L. A. Smith. There is plenty of grass and fuel close to the mines, and there are several running springs within three miles of them. There is a fair natural wagon road down there, leaving the Gila about a mile and a half from Rattlesnake Hill. The next water is at Las Playas, about fifty miles; thence twenty-five miles to Quitobaquito, where there are fine running springs and several rancherias; thence it is ten to fifteen miles to the Santo Domingo mines. The boundary line runs through Quitobaquito, leaving the spring on our side, but giving most of the good land to Mexico; it also puts the ranchos and towns of Santo Domingo and Sonoita in Mexico, but gives us the mines. The late Frank P. Clymer had valuable claims down there and shipped considerable rich ore, in spite of all the difficulties of desert transportation over new and unbeaten roads. He was very enthusiastic over the results, but he got afraid of his Mexican neighbors and his attention was absorbed, until his death, by his discovery of the Athens and other rich mines in Pinal county. The town of Sonoita is within a few miles of the mines; it has always borne a hard name as a rendezvous for smugglers and fugitives from justice. This has done much to keep away American prospectors and miners. One trail from Yuma passes west of the Gila range, crossing it at the Tinajas Altas, signifying high tanks. These are natural cisterns among the rocks and, after heavy rains, hold water for many months. There are eight of these tanks, one above the other. The highest two are very hard to reach, as the granite rocks are very smooth and slippery. They are distant from here about forty-five miles. From there it is about sixteen miles to the Tinajas del Tule, in the mountains of that name. The water here is a gulch, walled in by huge masses of granite rocks, which present a peculiar appearance, huddled together in every possible way. Some thirty miles further the trail intersects the wagon road on a mezquite flat at Las Playas. After passing the southeast point of the Salado mountain the trail passes on to Quitobaquito up a valley in which fair water can be got at many points by digging. Pros-

pectors will find plenty of water in the vicinity of Sonoita and Santo Domingo. No. IX, of the boundary, stands on the ridge, about one and a half miles north of the former village, so that all mines found north of that are safe to locate. From there the line runs westward a few feet south of the springs at Quitobaquito, north of Agua Dulce and Agua Salada, and south of Tinajas del Tule and Tinajas Altas. All that country has been examined for gold, but its silver ledges are nearly all new discoveries, and it seems reasonable to believe that there are plenty more left. L. A. Smith & Bro. have shipped several different lots of Santo Domingo ore and seem confident of good returns.—*Arizona Sentinel*.

Berkeley, the University Town and Business Center.

There are certain favored localities in our State, which seem to have in them the elements that ensure continual and nearly uniform growth and improvement. Berkeley is of this character. Situated in the northern part of Oakland township, on what was the old Peralta rancho, it commands magnificent views of the bay of San Francisco, with the Coast Range mountains on either side of it, and the boundless Pacific knocking at the Golden Gate.

The beauties of the situation were appreciated by the founders of our noble University of California, and it was appropriate that the site should be named in honor of Bishop Berkeley, who did so much to advance the cause of learning during its early struggles in the New World. He also wrote the poem, in which occurs the oft quoted line, "Westward the course of empire takes its way." How little did he think that his name would be borne in this year, 1878, by a university town on the shores of the Pacific, where more than 300 young men and women pursue their studies under able instructors without charge.

The natural and educational advantages of Berkeley are attracting people from all parts of the coast. The successful business men, who wish for more quiet and purer air than can be had in San Francisco, can but be pleased here, and the miner or farmer from the interior, who feels that his children should have a better education than he can give them in his isolated position, finds here the highest educational institution in the State. The climate at the foot of the Coast range, in what is called the warm belt, is remarkably mild and even, and favorable to the growth of almost all vegetation that a Californian wishes to beautify his home with.

From an elevation of about 350 feet, there is a gradual descent to the shore of the bay, two miles distant, where deep water is reached by wharves of moderate length at West Berkeley.

A line of street cars give direct communication from the University to Oakland, and a branch of the Northern R. R. runs to West Oakland and the San Francisco Ferry. The main line of the Northern R. R. runs along the shore through West Berkeley giving land transportation to the interior, while all river craft can load at the wharves. A steam ferry also plies directly between this point and San Francisco. These facilities for doing business promise to build up a manufacturing town on the water's edge corresponding to the educational center on the heights. There will be an increasing number of those who here find remunerative business, while their children are being fitted to take their places as good citizens.

The West Berkeley Lumber Yard, Mr. John F. Byxbee, proprietor, is supplying a great deal of building material for local consumption, and is prepared to supply all points in the interior which are accessible by water. When the railroad connections are completed with the interior, via Martinez and Benicia, an immense area will be added to their field for business, as they can then load cars at Berkeley for all points on the main railroad in this State, Nevada and Arizona.

Mr. Thos. Richardson, the manager, has many friends in the trade and among his old patrons throughout the coast. The Berkeley Gymnasium is a private boarding and day school of a high character, conducted by Mr. J. F. Burris and an able body of teachers. Opening in August, 1877, with 20 pupils, the number has increased in six months to 76, which is certainly a satisfactory showing. The avowed object of the institution is to prepare students for the University, and if this is properly carried out the youth of California will owe Mr. Burris a debt of gratitude.

There is a movement on foot to secure a charter for the "Town of Berkeley," in order to maintain good order, good schools, and preserve the health of the community. The intelligent class of men who ask for it should be able to get the charter without trouble, and use it with wisdom.

PATENTS IN GERMANY.—It is stated that the German Patent Office is overwhelmed with work, and that in the next budget an increase of expenditure will be proposed for the purpose of obtaining a larger staff. During the first four months of the existence of the new institution, 2,238 applications for patents were received, of which 1,019 were permitted to be published, and 159 rejected, 1,066 remaining to be dealt with.

Rains and Floods.

The long-continued and heavy rains of the past two months, having entirely dissipated all fears of a poor season for either miner, farmer or merchant of California, have brought fears of danger in the opposite direction, viz., of floods. Already, as mentioned, considerable damage has been done in different parts of the country by the overflow of accumulated waters in the overcrowded rivers. The large tracts of land under cultivation, which have been covered with water, have, of course, been seriously damaged for this season. A great deal of expense will be entailed for the construction of new levees and for repairing breaks, banks, levees, ditches, dams, etc. The railroad companies have been kept busy in repairing the roads, to keep them in order, and, in some instances, have had to abandon temporarily short stretches of road. The new line from Oakland Point to Martinez has been so much trouble to keep open that the efforts have been abandoned for the present. There have been so many slides in the cuts and in the banks that they have concluded to stop running the line until the rains cease causing slides. There are some peculiarities presented this season which are worthy of note. In 27 years prior to the present year, the quantity of rain has exceeded eight inches only in 11 months, viz.: in December, four times; January, five times; and February, twice. On four months only in 27 years has there fallen as much rain as in January of this season. The greatest amount that has ever fallen in a month was in January, 1862—18.10 inches. This was the winter of memorable floods, which lasted through December, 1861, and January, 1862, destroying an immense amount of property on the Pacific coast. It is worthy of note that the month just mentioned, viz., January, 1862, was, in fact, the only month for 27 years which exceeded the past month in a marked degree in its rainfall. The amount of rain for the season, up to noon on Wednesday, was 26.62 in San Francisco.

The Schively Process.

The Truckee Republican says: We have described heretofore the miniature furnace and process of mastering the obstinate ores found at Peavine, in Nevada State, and at Meadow lake, in our own county, but previous to Thursday we found no opportunity of witnessing the method, and, more, the furnace was not in prime order, as we on this day found it. The remodeling which we alluded to in our last, was merely an arranging for more draft, which was easily obtained, and now all works like a charm. The furnace itself is built of red brick, so it will be apparent that an excessive heat is not required, or the brick composing it would easily melt as well as the ore. Twenty pounds of Peavine ore was poured in at this trial, after which the material constituting the "new discovery" was added, and we stood awaiting results. About half an hour elapsed before the seething, liquid metal was drawn off, following which the ore, now reduced to a liquid state also, was in readiness to be tapped, leaving the furnace all nicely heated, ready for another lot, but it been on hand. We now have proof positive and indisputable of this fact, which is, that Peavine ore can be worked; and we have the gentlemen's word that the cost will not exceed \$10 per ton. We also have their word, as well as from witnesses, that they worked Meadow lake ore with less trouble, and next week propose running through another lot, for our full satisfaction. Messrs. Schively & Bro. leave for Reno to-day, at the earnest request of Reno's business men, to demonstrate fully to them the success of their discovery, and lay plans for early spring work. Meadow lake, however, is their main point for action, as they hold large interests there, and have unbounded faith—knowing the wealth of the ore—in making a large sum of money the coming season. We hope our citizens may be on hand to receive benefits, such as surely will accrue to owners of mines, business houses, etc.

HUMBOLDT SULPHUR MINE.—Mr. H. Blanchard, who has just returned from Humboldt county, gives us the subjoined items in regard to the sulphur mines near the Humboldt house. The company is now working in solid rock sulphur. The deposit is 30 feet thick, 50 feet wide and 50 feet deep. There is nothing but sulphur in sight, and every blast indicates increased quantities. Two hundred feet away another tunnel has already penetrated 20 feet of the same material. The company has refined and shipped 800 tons of pure sulphur, and think they have 5,000 tons in sight in their mine. The property is owned by the California and Nevada Sulphur Company, of San Francisco, the most of the stock being held by John Skinner, D. F. Fairchild and J. H. Lyman. Lyman is foreman of the mine. At present eight tons per day are being refined, and the company are putting up new steam works, which will increase the amount to 20 tons. The world uses annually about 50,000 or 60,000 tons of sulphur, of which amount some 6,000 tons are consumed on this coast. The most direct route from the mine to the railroad would be by a road connecting at Rye Patch, and would be some 40 miles in length. N. B.—The workmen in the mine believe in Hell.—*Enterprise*.

USEFUL INFORMATION.

What is Done in a Day by One Railroad.

At the last half-yearly meeting of the Metropolitan Railway Company, which owns the most important part of the London underground lines, being a section 8½ miles long, the following statement of the daily amount of work was made by the Chairman: I have here a statement showing the number of trains that we run over the system. I find over the main line there are 442 trains in the 24 hours, and over the widened lines 568; that makes a total number of trains in the 24 hours 1,010. Well, then, the first engine leaves the shed at a quarter past five in the morning and the last engine arrives at its shed at 1:15. That is on the main line; on the widened lines we are obliged to work during almost the whole of the 24 hours of the day. Our experience is that the great danger is not so much in the want of some mechanical invention—for, thanks to our great engineers and our practical men, we have made the invention, as regards its working, to a large extent a certainty in its action—the danger arises from the fallible human nature which we have to employ, and from the vast multitude of individual, manual and brain operations that have to be conducted hour by hour, in the management of so complex a system as yours. Well, gentlemen, now I will give you the figures of mere signaling. I find that we make in one day, in the 24 hours, 46,826 telegraph bell signals; I find that we make 46,826 telegraph train signals; I find that the movements of the signals and the points of levers, that the actual manipulation of levers backwards and forwards comes to 66,958; therefore, in one department alone, the mere signaling and working of your trains upon the block and interlocking system there are 160,000 operations performed every day by human hands, every one of which, of course, might lead to some mistake, which might, more or less, be injurious or damaging.

ERRORS IN USING SURVEYORS' COMPASSES.—A correspondent of *The Engineering and Mining Journal* mentions some minor sources of error in taking readings from the compass while surveying. After noticing certain inexplicable vagaries of a compass needle, and testing the metal of the instrument, and afterward examining the observer's pockets to determine whether anything of iron or steel was on his person, the cause of variation was discovered in the frame of the magnifying glass. The frame was of vulcanite, or hard rubber, polished to a high gloss; this frame was liable to become electrified by the slightest friction, such as is caused by carrying in the pocket. Further investigation showed that from a variety of similar causes, all ordinary frames of magnifiers are apt to give like trouble, and new ones had to be specially made which were free from the defect. The impure metal of cases, rivets and other parts may give rise to this attraction; an iron ring is sometimes inserted to fix the glass in the frame. Sometimes the observer may unconsciously carry the iron in his hat, in the wire that stiffens the brim. Aluminium, especially when hammered, has the polarizing property. Finally, there is a story of a land surveyor who had the appearance of his compass improved by nickel plating, which was applied to almost the entire instrument—ball, socket and sights—the effect of the needle being the same as if the brass had been coated with iron.

CENTENNIAL EXHIBITS.—The *American Manufacturer* says that a sale of Centennial exhibits will soon be made under authority of the United States Treasury Department. The goods in question were brought from foreign countries, the duties to be paid subsequently, and a bond being given and a claim held against the goods themselves for the payment of the duties. The goods were abandoned by their owners for various reasons, some because they could not pay the duties, and some because the duties were more than the goods were worth after the exposition. Exhibitors were allowed a year in which to remove their goods after the exposition closed. The year expired more than two months ago. It is probable that there will be three sales, one of show cases, heavy machinery and bulky goods at the main exhibition building; a second sale of large goods and machinery that had been stored in Government buildings; and a third sale of small articles and portable goods at some auction store. Among the latter class are the effects, furniture, china, plate, cutlery and linen of the late "Trois Freres" restaurant. As soon as convenient the announcement of the sales will be made public and catalogues given out.

TRAMPS.—The Nashville (Tenn.) *American* says: "As a freight train was passing around the foot of Lookout mountain into Chattanooga one of the brakemen discovered a tramp in a carload of mules. The tramp was astride one of the animals, and was asked what he was doing there. 'Driving mules to Chattanooga,' was the laconic response, as he yelled out 'whoa' to the animal. On looking into a car loaded with hogs another tramp was found, perfectly at home with the swine. 'Who are you?' demanded the brakeman, sternly. 'The hell-wether of the flock, leadin' 'em down into the fertile valleys of the Tennessee,' said the tramp, 'and we always ride upon a rail.'"

REGISTRATION OF MAIL PACKAGES.—We read that the Postmaster-General will probably recommend to Congress the following method for registration of mail packages. He proposes that the Government shall issue printed forms of receipts for letters, about three inches long and two inches wide; that they be put up in the form of books, perforated at one end so that they may be easily removed, and gummed on the back of one end so that they may be reattached either to the original book or to the pages of a letterbook. The blanks, he suggests, can be sold by the Postoffice Department at the rate of two for a cent. When any person makes up his mail to be sent to the postoffice, the plan is that a copy of the address of the letter shall be written upon one of these blanks and sent to the postoffice with the letter itself. When these are handed to the postoffice clerk he would be required to stamp the receipt and return it, but would make no mark from the letter itself not now required for cancellation and date. The receipts, with the postoffice stamp, could be preserved, and would be evidence that the letters or packages with which they corresponded had been deposited in the postoffice.

THE AFRICAN MUSKET.—The gun known in the Birmingham trade by this name, says the *British Trade Journal*, has changed neither its quality or pattern for many years past. These guns are sent to the west coast of Africa, where they are interchanged for palm oil and other products. But a few years back no ships' cargo trading with that coast was complete without a supply of them. The taste of the African is fickle in the matter of beads; a shade of color which is in demand one season may be unsalable the next; but it is not so with guns, wherein he rejects all improvements, and rigidly adheres to the old flint musket, with its bright barrel, which his father and grandfather used before him. There are various patterns of these African guns, as each district has its own peculiar taste. The barrels vary considerably in length, are variously stained, some black, others a brown-red, and others again a bright vermilion. Probably 100,000 to 150,000 of these guns made in Birmingham are annually exported.

GOOD HEALTH.

EUCALYPTUS ESSENCE.—According to a memoir presented to the Freuch Academy of Sciences, the essence furnished by the eucalyptus is a species of liquor camphor. The aqueous infusion of the leaves possesses uncommon anstringent qualities, due to the presence of a large amount of tannin. In exterior applications to sores and ulcerations, the essence and the infusion have been found singularly efficacious. The inhalation of vapor from the essential oil, and the smoking of the dried leaves rolled into the shape of cigarettes, give excellent results in affection of the respiratory organs. The febrifuge properties of the essence have been tested on a great scale in Austria and Roumania and Spain, and especially by Dr. Crunel, of Montevideo. It appears from his clinical observations, covering a series of years, that the eucalyptus, taken in an infusion or in pills, not only replaces quinine, but sometimes acts with efficacy where the latter had been fruitlessly employed. We may here state that the eucalypt resin closely resembles resin of chinchona, while the sulphate crystallizes in star-shaped crystals, like sulphate of quinia, and presents the green coloration on the action of chlorine and ammonia supposed to be peculiar to that salt. These chemical indications were abundantly verified in practice beside the sick bed in the hospital of Montevideo.

EPIDEMIC DISEASES AND PARASITIC LIFE.—Prof. Tyndall in the *Popular Science Monthly* says: The power of reproduction and indefinite self-multiplication which is characteristic of living things, coupled with the undeviating fact of contagia "breeding true," has given strength and consistency to a belief long entertained by penetrating minds that epidemic diseases generally are the concomitants of parasitic life. "There begins to be faintly visible to us a vast and destructive laboratory of Nature wherein the diseases which are most fatal to animal life, and the changes to which dead organic matter is passively liable, appear hound together by what must at least be called a very close analogy of causation." According to this view, which, as I have said, is daily gaining converts, a contagious disease may be defined as a conflict between the person smitten by it and a specific organism which multiplies at his expense, appropriating his air and moisture, disintegrating his tissues, or poisoning him by the decomposition incident to its growth.

LET THE BRAIN REST THE HANDS.—"There are many who get up in the morning weary from effects of the preceding day's labor. To such let me say, dear sisters, stop and think. Use your head more and feet less. Having poor health, and my own work to do, till within a few years, I soon learned to plan my work to save time and every feasible step. Thought and experience will teach you many ways of economizing strength."

LOOK TO THE CELLARS.—There is little doubt, says the *Herald of Health*, but many cases of ill health have their obscure origin in our cellars. What is the remedy for this state of things? First, and best, build a fireplace in every cellar, and have the flue connect with the main or most used chimney of the house; then the cellar will always be ventilated through the chimney instead of through the house; but in suitable weather always have the windows open, and the spaces closed by wire gauze. Beside this, make and use a convenient way into the cellar from out-of-doors, or at least from the woodshed. Some cellars cannot be made sweet and wholesome without better drainage, some mold everything until they have been made tight, then thoroughly fumigated with burning sulphur; and some need to have the floor of bricks or earth taken out and replaced by fresh bricks or gravel. In regard to the drainage of cellars it may be remarked, that in some situations it is cheaply effected by making a well down to some gravel bed or porous stratum. No cellar drain, at whatever distance from the dwelling, or whatever may be the fall, should ever receive the discharge from a water-closet or privy, or the poisonous gases engendered will inevitably find their way into the cellar, and all through the dwelling. In such a case the result may be serious disease and death, or it may be ill health and a lowering of vitality to a point that makes life hardly worth the having.

NEW MENTAL MALADY.—The *London Examiner* says: The Germans have discovered a new mental malady, which they call grubelsucht, or the "metaphysical mania." Dr. Oscar Berger writes learnedly on the subject in one of their scientific serials, and it would seem, according to him, that the symptoms of this disorder "consist in an irresistible current of ideas taking the form of useless inquiries as to the how and why of everything, pushed beyond the limits of what people of any sense have treated as the usual range of knowledge." It is comforting to know that the subjects of this disease are "generally young people," that it can be cured by "mild doses of bromide of potassium combined with the hydropathic treatment," and that those who suffer "seldom require to enter lunatic asylums." How wisely does Providence order all things! Were it otherwise, the mad-houses of two hemispheres would not suffice to contain the contingent of these newly-discovered maniacs that must be delivered up by the Scottish and German universities—not to mention that which would be furnished by the "noble army of martyrs" in England who pine in the pursuit of "endowed research."

LIEBIG ON LIQUORS.—The following is a translation of a paragraph found in the writings of Prof. Von Liebig, the distinguished German chemist: "The white wines are hurtful to the nervous system, causing trembling, confusion of language and convulsions. The stronger wines, such as champagne, rise quickly to the head, but their effects are only of short duration. Sherry and strong cider are more quickly intoxicating than the generality of wines, and they have a peculiar influence on the gastric juices of the stomach. The intoxication of beer is heavy and dull, and it does not hinder the drinker from gaining flesh. The drinkers of whisky and brandy are going to certain death. Red wine is the least hurtful, and, in some cases really beneficial."

HYGIENIC PRECAUTIONS.—The *Tribune* says: One or two precautions any man may take, beside the ordinary hygienic ones, to lengthen his days. First, to keep his brain, as far as possible, at work on one subject at a time. It is the multitude of conflicting ideas which wears it out by actual physical strain. Hence the brain of a man who controls the divers occupations of other men, or who is accustomed to carry on separate trains of thought, will give way sooner than one which is confined to one branch of study or work. Secondly, to make absolute the pauses for rest, the stoppage of work must be complete to be worth anything. Thirdly, if possible, to have a hobby, some manual work which requires also an exertion of the mind totally different from its ordinary work.

THE CONTAGIOUSNESS OF DIPHTHERIA.—A striking case of the communication of this disease is reported in the *London medical journals*. "A few weeks ago the children of Mr. Lawrence, of the Bridgewater hotel, Ellesmere, were at Duddleston, and being thirsty a glass of water was procured from a cottage, where, it subsequently appeared, a child was suffering from diphtheria, and one or more of the children drank of it. Since then they have all been fatally attacked with the disease, and finally the sixth and last surviving child succumbed to it. The hotel has since been closed, and thoroughly cleansed and disinfected."

APPLE SUPERSTITIONS.—The ancient Arabians believed that the apple had some mysterious relation to health. In England and Germany it has been deemed potent against warts. Sometimes it is regarded as a bane. In Hestia it is said an apple must not be eaten on New Year's day, as it will produce abscess. In Pomerania it is eaten on Easter morning against fevers; in Westphalia (mixed with saffron) against jaundice; while in Silesia an apple is scraped from the top to cure diarrhoea, and from the bottom to cure costiveness.



W. B. EWER.....SENIOR EDITOR.

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The Week.

The heavy and almost incessant rains, causing an unprecedented stage of high water in the Sacramento river and some of its tributaries and the inundation of vast tracts of country lying along these streams, leading to some loss of life and an immense destruction of property, has constituted the absorbing topic of interest in this community the past week. No such extreme and damaging flood has occurred since the American occupation of the country, the injury, direct and consequential, resulting from this being estimated at between \$7,000,000 and \$10,000,000. While thousands of small farmers and property owners have been stripped of almost everything, many large land proprietors have been nearly ruined. In these losses the State will experience something of a set-back, notwithstanding the promising outlook for most of our leading industries. As we write, near the end of the week, the weather wears an unsettled aspect and we should not be surprised to see more rain before another day passes. It is reassuring, however, to know that we are now near the end of our wet season, prolonged rainfalls rarely occurring later than February. While our people are divided in opinion as to the effects of the impending silver bill, the feeling is not demonstrative one way or the other. Hence, while it is the subject of much discussion, we shall not get excited over it whatever its fate. The arrest and partial examination of J. C. Duncan and those charged with aiding in his attempted escape, has furnished conversational matter amongst all classes as well as staple for extended newspaper comment. The city remains full of idle and destitute people, for whose relief and employment much is being done by private exertions, also something by the public authorities.

Heavy Mining Machinery.

The Immense New Pumping Engine for the Yellow Jacket Mine.

We have had the pleasure of examining, this week, the immense new pumping machinery manufactured by Prescott, Scott & Co., of the Union Iron Works in this city, for the Yellow Jacket mine, on the Comstock. This is the heaviest machinery of the kind ever made on this coast, and probably in the United States. An idea of its magnitude will be best conveyed in the statement that the engines, pumps, boilers, etc., weigh, in the aggregate, upwards of 1,200 tons, and these large iron works, employing about 500 men, have been nearly five months engaged on the job, the expense being upwards of \$300,000. The engine, air pump, etc. was all set up in the shops this week, and numbers of persons availed themselves of the opportunity of examining its massive proportions. It is now being taken apart and shipped to its destination. A special car had to be constructed to take portions of the machinery which were too heavy for the ordinary flat cars.

The machinery consists of a horizontal compound condensing engine, the cylinders being set side by side. The engine bed consists of a box frame of cast iron to take the outside flanges of the cylinders, main guides and fly wheel shaft pillow blocks, which are all securely bolted in their respective places. This frame is 64 feet long, 18 feet wide under the cylinders, and 34 inches high, each side being in three pieces bolted together, one side being connected to the other by three cross braces. In addition there is another box frame to which the inside flanges of the cylinders are bolted. This frame is 34 inches high and 20 feet long.

The initial cylinder is 31 inches in diameter, and weighs 12 tons; the expansion cylinder is 62 inches in diameter and weighs 30 tons. As economy in the consumption of fuel has been kept prominently in view in the construction of these engines, every possible precaution has been taken to prevent loss by condensation. To this end the cylinders and cylinder heads are steam jacketed; that is the cylinder is really made in two parts, an outside shell and a "liner," and between these two parts is left a space which is kept filled with steam. The liner is the inner shell in which the piston slides, and has the outer shell shrunk over it, flanges on which it rests being placed between the two shells, so that the steam may completely envelop the liner.

The bore of the initial cylinder is 31 inches, the liner is 1½ inches thick and the space between the liner and inner side of the outer shell is three-quarter inches all around, thus forming a steam jacket, steam being admitted to the space referred to as to keep the cylinder at a proper heat to prevent condensation. The bore of the liner of the large cylinder is 62 inches and the thickness of the liner two inches, the inside diameter of the outer cylinder being 67½ inches. It was no small job to make steam jackets on such large cylinders. To accomplish it, after the outer shells of the cylinders were bored true, they were set on end, fires lighted inside of them so as to expand them by heat. Then the liners were lifted by the cranes and lowered into their places in the shells, which shrunk tight around the liners on cooling, leaving a space of three-quarter inches all around for steam.

The outsides of the cylinders and the cylinder heads are covered with five inches of asbestos; and the steam pipes, and all exposed steam surfaces, are covered with the same non-conducting material, of the best quality, to prevent condensation and consequent loss.

The piston rod of the initial cylinder is six inches in diameter, and that of the expansion cylinder ten inches. The cylinder heads are fitted with relief valves, as is usual in engines of this size. The relief valves have their seats at the inner face of the cylinder head, thereby saving the clearance of the old style relief valve. The clearance of the cylinder steam passages and valves is reduced to the smallest possible space consistent with safety.

The engine has a 12-foot stroke, both pistons being connected to one cross-head, on which they work simultaneously. This cross-head is an immense piece of metal, which weighed in the rough over 22,000 pounds. It is probably the largest piece of wrought iron ever forged in this city, and has been beautifully finished since forging, the sides and edges having all been rounded off. It is 20 feet long, 9 inches thick one way and 3 feet thick the other. The main guides for the cross-head form a portion of the engine frame.

A direct connection is made between the cross-head and the main pump hoh by a single open pitman rod. This had to be made in a peculiar manner for the sake of compactness, to allow the fly-wheel shaft to rest on the pillow blocks on the frame in a direct line between the cross-head and the pump hoh. Therefore a solid iron rod was inadmissible. This main connecting rod or pitman is 40 feet long between centers, and 49½ feet long over all. It is an open strap rod, the sides being formed of wrought iron plates 3 inches thick by 18 inches wide, the thickness being increased to four inches at each end. This is braided by a plate on each side 1½ by 15 inches, securely connected by rivets and angle irons, forming a T iron. The two sides are bolted together at the ends and at intervals by 15 three-inch bolts, leaving an open space in the middle of the rod through

which the crank shaft passes. The journal of the pin of the pump hoh is 12 inches in diameter and 16 inches long.

There is also a connection from each end of the cross-head to two 30-foot balance wheels by 24-foot connecting rods, working on pins of six-foot cranks, these cranks forming part of the balance wheels. The balance wheels are placed one on each end of an 18-inch wrought iron shaft working on journals on top of the engine frame, the position of this shaft being between the cylinders and the pump hoh, passing between the open part of the main pitman rod as before stated. The journals of the fly wheel shaft are 18 inches in diameter by 24 inches long, the shaft being 18½ inches in diameter between the journals and 16 feet long over all. The two balance wheels are 30 feet in diameter and 10-inch face, the hubs of the same forming the cranks of the engine. Each wheel is made on 12 segments, and to each segment is cast an arm. The segments are held together by heavy keys and links, the whole being connected to the hub or center by four-inch bolts passing through each arm and being keyed to the hub. The crank pins to which the side rods are attached are nine inches in diameter by nine inches long in the journals.

A brief description of the valve motion of this engine will be of interest to engineers. The admission and emission of steam in the two cylinders is accomplished by eight valves, four for the admission and four for exhaust. The admission valves are of the Cornish double-beat style and the exhaust valves of the American double-beat form. Each valve is independent of the other and is raised by a cam, attached to a shaft, on the end of which is an arm, connected to a main rock shaft, placed across both cylinders and moved by an eccentric, fixed on the fly-wheel shaft. Each valve, by the construction of its connections, is lifted quickly and the exhaust remains open during the entire time of the piston stroke.

Each admission valve is controlled by O'Neill's variable cut-off, recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by Mr. Eugene O'Neill, chief draughtsman at these works. This cut-off is so constructed as to drop the valve at any part of the stroke. It consists of a shaft moving on the valve-stem, and in each end of which is fixed a segment of a circle, resting on rollers, situated in the end of a block, sliding on the valve-stem and resting on the cams that raise the valve. These two segments are worked by an independent eccentric, moving with the piston of the engine, and, by sliding off the rollers, allows the valve to drop. By changing the position of the segments, with a right and left-hand screw, the time of the drop of the valve is altered at will. On one side of the air-pump is hotted a feed-pump for the boilers, which is worked from the same rock-shaft. This feed-pump is six inches in diameter and six-foot stroke. The condenser is placed in a vertical position in the channel of the air-pump, with injection on top, both air-pump and condenser being placed at the side of the expansion cylinder. The condenser is 36 inches in diameter by eight feet high, fitted with spray injection pipe.

For this machinery there are eight boilers, arranged in pairs, which, however, are to run the hoisting engines also. They are horizontal, tubular boilers, 54 inches in diameter by 16 feet long, each being fitted with the usual safety valves, connections, etc. They are so arranged that any pair can be disconnected for the purpose of repairs, or steam can be used from one or all the pairs. In addition to the other precautions for economizing in fuel and steam consumption, the boilers are all placed below the engines, so that all the condensed water from the jackets or cylinders is returned to the boilers and that heat saved. This shows with what care the whole general plan has been carried out.

The main pump-hoh is 38 feet six inches long from the center of the pins and is 21 feet high. The main shaft of the hoh is 21 inches in diameter between the journals, the wrought-iron journals being 22 inches long and 18 inches in diameter. There are six diagonal braces, made of wrought iron, three inches thick and 14 inches wide. The journal of the pins, connecting with the main pump-rod, is 15 inches in diameter by 17 inches long. The main pitman-rod, which connects with the wooden pump-rod in the shaft, is 37 feet long. It is made of wrought-iron, 15 inches wide and five inches thick at the upper end, decreasing to one and a quarter inches thick at the lower end, all well bolted and keyed together.

The air pump is horizontal, and is driven by the main cross-head, working a cast-iron rock-shaft by levers and rods. It is fitted with four suction valves and six discharge valves, made of rubber working on brass seats. This air pump is a fine piece of machinery, and weighs alone, with its fittings, 24 tons. The barrel is 36 inches in diameter by six feet stroke, lined with half-inch brass. This air pump is specially designed to insure perfect action. The vapors rising from hot water can pass directly from the receiving valves to the delivery valves, and be forced out by the water upon the return of the piston, vapors always occupying the upper surface, a very important point in an air pump.

With the rest of the machinery are six plunger pumps, 14 inches in diameter and 10 foot stroke; also one 14-inch bucket pump. These pumps are very heavily built, being as strong as possibly could be made. They force the water up to the surface through a 14-inch tubing.

One can hardly get a conception of the massive proportions of this machinery without actually seeing it. The engines are designed to work up to 1,500 horse power, the initial cylinder being intended to run with a pressure of 130 pounds, and being made very strong for this pressure. There are on this machinery upwards of 90 of Loneragan's patent oilers, all nickel-plated, besides two half-gallon Siebert lubricators, and two oil pumps fitted to the cylinders. The engine is fitted with the necessary gauges, indicators, revolution register, etc., all silver-plated and mounted on a handsome frame. The engine will be very ornamental when finally in place, as a large proportion of it is bright work, which has been beautifully finished. The rougher parts, such as the frame-work, etc., will be neatly painted, as is usual. A nicely-finished iron platform, with polished railings, is mounted on each side of the engine and extends across the front of the cylinders, for the convenience of the engineers and those desiring to see the entire machine in operation.

On each side of the slides is a brass plate. One of these is emblematic of the great industry to which the machinery is devoted. In the center is the figure of a miner at work in a drift, and surrounding it are objects and scenes incident to a miner's life—a miner's tent, flumes, timbers, etc. The other plate bears the following inscription: "Yellow Jacket Mining Co.; T. G. Taylor, Superintendent; W. H. Patton, Constructing Engineer; Prescott, Scott & Co, Builders, 1878."

The engine combines all the modern improvements in engineering, so as to get a direct motion from the engine to the pumps, and have a rotating motion for all the steam valves. To accomplish this, the plans carried out were designed by Col. J. G. Fair, Superintendent of the "honanza" mines; W. H. Patton, Assistant Superintendent and Constructing Engineer; T. G. Taylor, Superintendent of the Yellow Jacket mine; J. G. West, Chief Engineer of the same mine, and Irving M. Scott, one of the proprietors and General Superintendent of the Union Iron Works. The detailed drawings were worked out by Mr. Eugene O'Neill, Chief Draughtsman of the Union Works.

The result so far reflects credit on all concerned, as well as to the foundry interests of the city. The quality and style of machinery speaks for itself in terms complimentary to the projectors and constructors.

The foundations for this heavy machinery are already being laid, and will shortly be completed. They are made of solid masonry work, 30 feet in depth. The anchor rods, and bolts to pass through the bed frames, are 26 feet long and built into the masonry.

The new shaft of the Yellow Jacket mine, on the Comstock, on which this machinery is to be placed, is now down about 1,300 feet, and will be sunk to at least 2,300 feet. The main east drift on the 2200-foot level of the mine is directly under the line of the new shaft, so that they will raise from that level to expedite matters. When the connection is completed, all the water from the mine will be raised through this shaft. The cost of this new shaft, including the machinery described, is estimated at \$1,600,000. This includes all the pumping engines and fixtures, hoisting engines and equipment, compressor and fixtures, hoisting rig for the new pump shaft, etc. The whole is the finest piece of work ever built on this coast, being in Col. Fair's best style. The machinery is of a capacity sufficient to work the shaft to a depth of 3,000 feet.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Northern Belle, Feb. 20th, \$2,719.32; Grand Prize, 25th, \$27,200; California 23d, \$289,322.08; Con. Virginia, 23d; \$197,813.33; Tybo Con., 20th, \$9,238.25; Eagle, 21st, \$2,215.89; Christy, 25th, \$2,960; Tybo Con., 22d, \$4,715.30; Leopard, 26th, \$5,500; Northern Belle, 23d, \$3,234.69; Endowment, 28th, \$3,960.97.

SAN FRANCISCO DIRECTORY.—We have received from Henry G. Langley the new city directory for this year, a volume, which aside from its usefulness as a book of reference, contains much information of interest and value. In our next issue we will give some facts compiled for this directory, regarding the population of the city, extent of manufactures, etc.

The late remark of James G. Fair, that "the baby's horn and it is bigger than its daddy," is construed by the Comstockers to mean that the east drift on the 1750-foot level of the Consolidated Virginia has developed an ore body larger than the honanza opened three years ago in that mine.

Among the recent shipments to Europe by the Waltham Watch Company was a lot of 200 stem-winding watches, by order of the British government, for the use of conductors and engineers on the state railroads of India. This order was obtained in direct competition with foreign manufacturers.

The lockout of 4,000 weavers at Oldham, not quickly terminated, is likely to cause th disemployment of 30,000 operatives in other branches of trade.

The steamer John L. Stephens goes to Alaska, to be used as a floating cannery during the fishing season, after which she will steam back to this city with her cargo.

Prospecting Associations.

When we contemplate the extent of our mineral domain, the varied forms of our metalliferous wealth and the several methods adopted for utilizing the same, we perceive to what vast proportions this branch of industry must soon attain on this coast. With our deposits of gold and silver, coal, iron, copper, lead, cinabar and other useful metals and minerals, mining is destined to become here a controlling pursuit, absorbing an immensity of capital, and giving employment to a large population. Our mines cannot, like our agricultural and grazing lands, be easily monopolized, while their product is less affected by competition and an overstocked market than most other commodities. These are conditions that must invariably attend the business, rendering it attractive alike to men of large and small means. Promising to become an industry of such overshadowing importance, it is well that the most stringent laws should be enacted for the protection of those engaged in it. It should be hedged about by every safeguard that legal and legislative ingenuity can devise. But after all this has been done, it will often happen that incorporated companies, with their superintendents and secretaries, their boards of directors and other official machinery, will so manage their affairs as to evade these statutory provisions and oppress the small shareholders. Persons of limited means must therefore hit upon some other method for engaging in mining operations or else forego their benefits altogether.

The plan of forming associations for this purpose, after the manner herein mentioned, has been adopted of late and found to work satisfactorily. A small number of persons, the fewer, so they have enough means, the better, enter into a partnership for this special purpose. This is effected by a written agreement setting forth the objects and conditions of the association, signed by the several members, consisting, we will suppose, of 10 persons, three of whom are to proceed to some section of country, as Arizona, for instance, and three engage in prospecting for and otherwise securing mining interests and locations. At the start a fund sufficient for outfitting these parties and transporting them to the field of operations must be raised. This will require, say, \$1,000, towards which each member of the association contributes \$100. To keep this party in the field, pay cost of living, assaying ores and recording claims, etc., will involve a monthly expenditure of about \$500, towards which each member will contribute \$50. These three men, who will do all the work required to hold the claims taken up, will receive each \$100 per month and board. As they each contribute \$50 towards this sum their actual wages will be but \$50 per month, a fair consideration, seeing that they come in for their share of all interests and properties secured. If these prospectors have had some previous acquaintance with the business so much the better, and as a general thing it might be well to exact from them bonds for the entire and faithful performance of their duties. They would not be expected to make extensive developments on the claims located, but always to do work enough to meet the requirements of the law and as much more as practicable. If they should be fortunate enough to strike a deposit of sufficiently high grade ore to warrant extraction, they would, of course, set to at once, and utilize it as fast as possible. As this is a contingency on which it will not do to depend, parties entering into an association of this kind should calculate to be kept under contribution for some time, perhaps a year or two, during which they would be almost sure to get hold of one or more properties of such evident value, that they would be able to sell it to capitalists, or one that would itself defray the cost of its own development. This, at all events, would as a general thing be likely to prove a more safe and satisfactory way of investing in mines than the plan now so often adopted by people of small means, who, in buying mining shares or embarking in large companies, are almost sure to be losers in the end.

LOWER CALIFORNIA MINES.—A gentleman is now in the city from the gold mines, near Barry Hyde's, whose name we did not learn, but from whom some items of interest in regard to these mines are learned. The distance to the mines, from this city, is near three hundred miles. There are a number of persons at work in them, and the gentleman says that all who are fixed for mining there, are making from \$7 to \$10 per day. It is seven miles to the water, and consequently a burro is needed to convey the dirt to it. An outfit for the mines would embrace picks, shovels, pans, washer, camp equipments, provisions, and an animal to do the packing. Our informant says that there is no scarcity of paying placers, and that many more than are there at the present time could find good diggings. In one of the placers nuggets of the value of \$20 or over have been taken out.—*San Diego Union.*

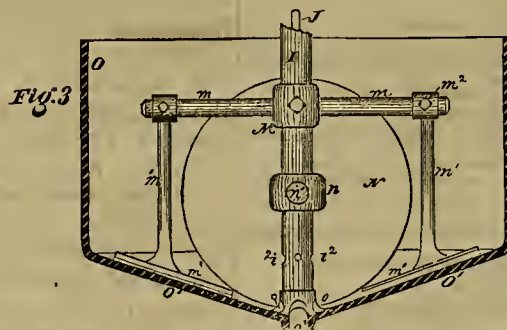
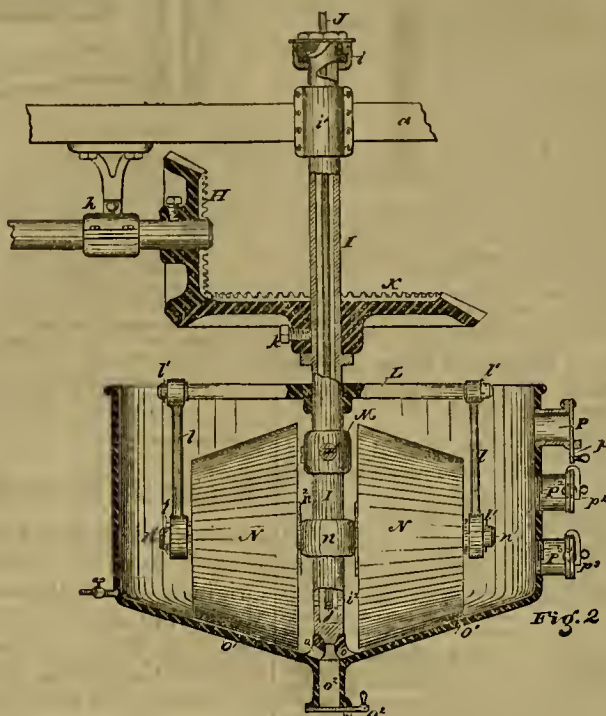
It is stated that the yearly cost of raising coal in England will be increased \$70,000,000 in consequence of the laws passed by the government for regulating that business. While aiming to correct abuses governments should be careful not to unduly increase the cost of commodities to the consumer by imposing unnecessary burdens on their production.

A New Work on Arizona.

To the publishers we are indebted for a copy of the "Hand Book on Arizona," just issued from the press of Payot, Upham & Co., of this city. This book, which comprises some 500 pages, is gotten up in the usual good style of this house, being printed in large and handsome type, and of a form and size to be conveniently packed about by prospectors and miners, for whose use it is especially adapted. It is pro-

ject peninsla of Lower California, prepared by the Jesuits nearly 200 years ago. The volume is accompanied by a large and accurate map of Arizona, compiled from the most recent and reliable data extant.

In an appendix to this most useful and interesting work is given a summary of the mining laws, Federal, Territorial and local; also the laws in relation to desert and timber lands; homesteads; pre-emption, Spanish and railroad grants, etc.; a list of land offices and Territorial officials; tables of routes, distances, altitudes, fares, etc.; a list of incorporated mining compa-



FIGS. 2 AND 3. SECTIONS OF ORE WASHER.

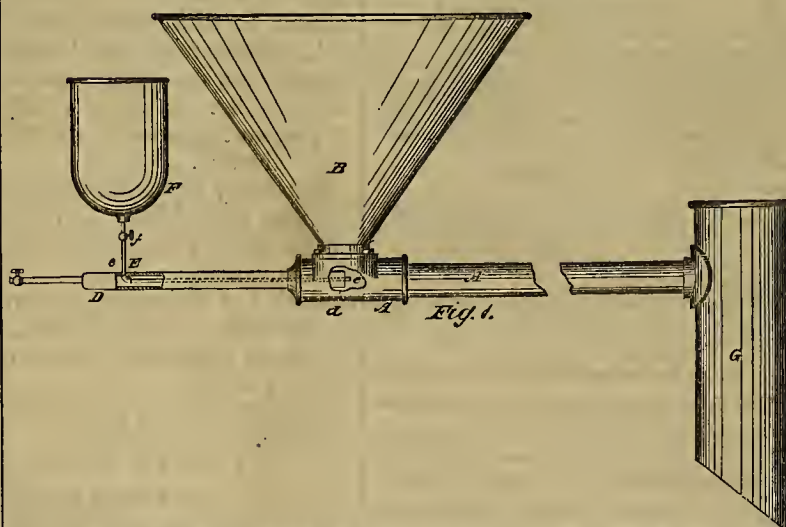


FIG. 1. THE FORSTER-FIRMIN AMALGAMATING APPARATUS.

fully illustrated, containing numerous woodcuts and beautifully lithographed engravings, representing localities and scenes in Arizona and along the route of the Central Pacific railroad. The former embraces views of the principal towns and mining camps in the Territory; also of the great canyons of the Colorado, together with the towering peaks and domes and mesa lands that form such conspicuous objects in the topography of that country. The Aztec ruins and cliff houses, the old mounds, with the domestic utensils and other relics of the ancient inhabitants, and, in short, all that has so excited modern curiosity in regard to this strange people, is here faithfully depicted to the eye. Bound in the book are maps of the leading mining districts; also a map of this and the ad-

jacent peninsula of Lower California, prepared by the Jesuits nearly 200 years ago. The volume is accompanied by a large and accurate map of Arizona, compiled from the most recent and reliable data extant.

This book, with all its accompaniments, has been prepared by Col. Richard J. Hinton, a well-known San Francisco journalist, who has spent many months traveling through Arizona, collecting the material of which it is composed. It is, moreover, thoroughly practical and could not have appeared at a more opportune moment, a great deal of attention being now turned towards this rising Territory, concerning which there was before a dearth of recent and reliable information. The book may be procured at publishers' rates—\$2, post-paid—by addressing Dewey & Co., 202 Sansome street, S. F.

Portable Gold Saving Machine.

Messrs. Frank A. Brooks and Chas. H. Stuart, of this city, have applied for a patent through the MINING AND SCIENTIFIC PRESS Patent Agency, for a portable gold saving machine, which is especially adapted for placer mining, but which can also be used as an amalgamator for separating and saving the valuable portion of ore pulp. The machine consists of a series of oppositely inclined short sluices, placed one below the other in a suitable frame, so that the material which flows from the lower end of one is caught upon the upper end of another. These sluice sections are lined inside with copper plate in the usual manner. An opening is provided at the lower end of each inclined section through which the material will fall on the next sluice below; or the lower end of the inclined section is left open and the upper end of the section below is projected beyond the lower end of the one above, with a shield to prevent overflow of material, and to turn or reverse it as it passes to the lower sluice. In this way every particle of dirt comes in direct contact with the amalgamated surfaces of the sluices. The series of sluices is mounted inside a large main frame on anti-friction bearing, and a feeder is provided on the upper end of the main frame so as to feed into the sluice.

A horizontal shaft is mounted on bearings on one side of the machine so as to extend entirely across one side. At the middle of this shaft is formed a crank. The shaft has a toothed wheel at one end, and it is driven by hand power through a crank shaft and spur wheel. A connecting rod passes through between two of the sluices, and has one end connected with the crank, while its opposite end is attached to the sluice frame on the side opposite the shaft. Now by turning this crank the shaft is rotated, and the connecting rod communicates a quick side shaking motion to the entire series of trays or sluices.

In connection with the series of shaking sluices, a quicksilver pool is used into which the material passes from the lower most inclined sluice. This pool has a sliding gate arranged across it, the lower end of which extends below the surface of the quicksilver in the pool. A vertical rod or shaft extends down into the pool behind the gate, and has a screw formed on its lower end, which serves to draw the material down under the surface of the quicksilver, so that it will rise on the opposite side of the gate, and flow off down the waste sluice.

The material to be treated is dumped directly into the feeder, and falls upon the screen which is placed between the feeder and first sluice; the shaking motion of the sluice frame causes it to be sifted through the perforations, and falls uniformly upon the amalgamated bottom of the inclined sluice below; thence it flows down from one incline to the other until it passes into the quicksilver pool, and is forced under the gate and flows off.

This treatment causes every particle of the material to be brought into direct contact with the amalgamated surfaces and with quicksilver, by means of which the gold is separated and saved, while the debris passes off down the waste sluice. Parties desiring further information on this subject can address Mr. Frank A. Brooks, care of this office.

Mining Patents.

The following patents have been issued for Pacific Coast claims: California—Amador county—Alpine company, Wheeler quartz mine; Cornelius Randall, placer claim. Calaveras county—Charles Whitlock, Fairplay quartz claim; Wm. Burnett, placer claim. Mariposa county—Robert Fry, Jones Flat, placer claim; Alonzo Brooks, Boss quartz claim. Nevada county—N. A. Caricon, Lake City Consolidated gravel mine; Yuba company, Yuba quartz ledge No. 2. Stanislaus county—Henry B. Pentland, Buena Vista placer claim. Trinity county—Henry Loerns, Mammoth placer claim.

Arizona—Joseph Hargrave, third north extension of the War Eagle mine; Fred. Williams, first south extension of the War Eagle mine.

Nevada—Ada Fairfax and others, Enterprise mine and mill site; Samuel Cooper, Williamsburg mine; Phoenix company, Adams and Faran Deep mines; James Reilly, Boston lode; Mobile and Equality company, Mobile and Equality mine.

New Mexico—S. S. Brannis, Satisfaction mine.

Montana—Hope company, Comanche and Wahuss lodes; Albert Clark, Park lode.

Utah—Ferdinand Dickert, and others, Prince Albert and Mariposa mines; Thomas B. Oney, Amazon mine; R. C. Chambers, Last Chance and Banner mines; Lawrence A. Brown and others, Indicator, Silver Treasure and first north extension of Miners' Delight lodes; George E. Bell, Baker mine; R. C. Chambers, assignee, King of the West mine; Eli B. Kelsy, Merrimac and Vesperian mines; John Tiernan, Live Pine mine; Empire Tunnel company, Empire lode; Charles McLaran, Royal and Old Bull mines.

Dewey & Co., 202 Sansome street, are now prepared to procure patents for mining claims, and will give any information desired on the subject, on application.

THE Silver bill has finally passed both Houses over the President's veto.

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The shrewdest and most experienced Inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

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In addition to American Patents, we secure, with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and permanently established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than any other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of inventions discovered here than any other agents.

Situated so remote from the seat of government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

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We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communications and business transactions will be held strictly confidential by us. Circulars free.

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Our long experience in obtaining patents for Inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

Engravings.

We have superior artists in our own office, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

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From A Patentee.

HUNSAKER, TULARE CO., CAL., Jan. 15, 1878.
* * * * * You will now receive my grateful, heartfelt thanks for the able manner in which you have conducted the interest entrusted to you by me. Your acknowledged ability, confirmed to me as it is by the successful presentation of my claim for a patent on a pump power, not only delights me, but suggests the propriety of a continued patronage and that of all my friends. With kind wishes for your future success, I subscribe myself, yours respectfully,
A. L. HUNSAKER
Messrs. Dewey & Co., Patent Solicitors, S. F.

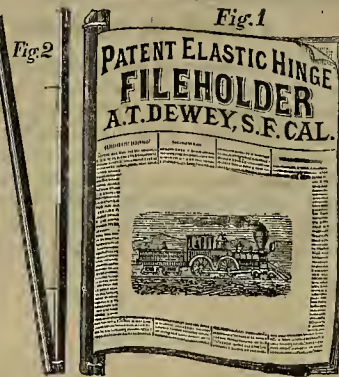
TO QUERISTS.

In propounding questions to the editorial, patent or business departments of this office, letter writers should be careful to enclose a stamp and addressed envelope if they wish prompt answer. If we were to furnish time, paper, envelopes and stamps, all free to parties who address this office on matters of more interest to themselves than to us, FIVE HUNDRED DOLLARS A YEAR would not cover the expense. This hint, however, is not intended for parties writing in our own or the public interest, or who would be obliged to delay writing at any time for want of an extra stamp.

EVERY new subscriber who does not receive the paper and every old subscriber not credited on the label within two weeks after paying for this paper, should write personally to the publishers without delay, to secure proper credit. This is necessary to protect us and subscribers against the acts and mistakes of others.

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IONE VALLEY, Cal., January 20, 1878.
Messrs. Dewey & Co.—Gentlemen:—I received my patent last night, and was glad to find that you were so prompt in the matter. I am pleased to give you the credit due you for the faithful and honorable manner in which you have discharged your duty in getting my patent. I shall hereafter recommend you to the public as having discharged your duty with honor. Yours, etc.,
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Varied in its carefully compiled and conveniently arranged departments, representing the special and leading industries of the Pacific States—Mining, Mechanism, Manufacturing, Building, Improvements and Inventions—it becomes a weekly informant to all Scientific, Mechanical, Manufacturing and Industrial Progressionists on the coast, an immense list of whom testify to its pleasant, profitable and elevating influence.

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Dissolution.

JOHN L. BOONE, Esq., having withdrawn from the firm and business of Dewey & Co., and disposed of all his right, title and interest in the assets of said firm to his partners, Messrs. A. T. Dewey, W. B. Ewer and Geo. H. Strono, notice is hereby given of the dissolution of said firm, by mutual consent. Mr. Boone retires from the firm in order to devote himself principally to his specialty in patent law practice. All debts, credits, etc., of the old concern will be settled by Messrs. Dewey, Ewer and Strong, who will continue the business under the title of the old firm.

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Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Feb. 7.	Week Ending Feb. 11.	Week Ending Feb. 14.	Week Ending Feb. 18.
Alpha.....	111	104	104	94
Alfa.....	94	73	81	81
Alfa.....	80c	75c	75c	65c
Alfa.....	54	5	4	21
Alfa.....	1.20	1.10	1.05	80c
Baltimore Con.....	4	4	4	4
Belcher.....	80c	75c	75c	65c
Belmont.....	184	174	174	174
Bullion.....	4.80	4.30	4.30	3.65
Bechtel.....	11	1	1	1
Bentley.....	1.40	1.20	1	1
Caledonia.....	3	2.60	2.60	2.20
California.....	284	274	284	284
Challenge.....	34	30	32	31
Confidence.....	54	44	43	43
Con Imperial.....	85c	70c	60c	75c
Con Virginia.....	24	23	23	23
Crown Point.....	51	5	4	10
Dayton.....	25c	25c	20c	20c
DeFrees.....	50c	40c	40c	30c
Day.....	1	50c	15c	60c
Eureka Con.....	34	24	23	23
Exchequer.....	3	2.45	2.55	2.35
Endowment.....	1.10	80c	90c	10c
Gen Thomas.....	30c	35c	25c	15c
Grand Prize.....	134	134	134	134
Gila.....	85c	60c	60c	60c
Golden Charter.....	85c	1	95c	1
Gould & Curry.....	81	81	71	81
Hale & Norcross.....	11	10	10	10
Hussey.....	85c	70c	60c	50c
Julia.....	2.20	1.40	1.31	1.31
Justice.....	111	104	104	104
Jackson.....	3.05	3	2	2
Joe Seates.....	30c	50c	30c	30c
K K Con.....	4	4	4	4
Kentuck.....	15c	10c	10c	10c
Kosuth.....	15c	10c	10c	10c
Lady Wash.....	8	7	7	7
Leopard.....	65c	50c	55c	30c
Leviathan.....	20c	2	2	2
Leeds.....	2.20	2.05	2	2
Modoc.....	45c	30c	35c	15c
Manhattan.....	104	94	10	94
Meadow Valley.....	25c	20c	25c	20c
Mexican.....	70c	60c	70c	25c
North Con Virginia.....	1.90	1.65	1.60	1.55
New York.....	104	104	11	104
Northern Belle.....	1	30c	1.60	10c
Norcoso.....	1.15	60c	1.55	1.15
Navajo.....	56	48	51	51
Occidental.....	56	48	51	51
Overman.....	174	154	154	144
Panther.....	64	44	43	43
Raymond & Ely.....	10c	5c	5c	5c
Rock Island.....	124	124	104	104
Savage.....	30	27	28	28
Seg Belcher.....	4.70	4.30	3.65	2.65
Sierra Nevada.....	3	2.40	104	2.65
Silver Hill.....	5	4	4	4
Succor.....	2	1.95	2	2
Solid Silver.....	80c	65c	70c	60c
Star.....	124	114	114	104
Trojan.....	20c	15c	15c	10c
Union Con.....	50c	30c	35c	30c
Utah.....	11	9	10	10
Wells Fargo.....	50c	30c	35c	30c
Woodville.....	11	9	10	10
Yellow Jacket.....	11	9	10	10

Sales at S. F. Stock Exchange.

Saturday A. M., Feb. 23.	180	Overman.....	154	1.40
750 Alta.....	84c	300 Sierra Nevada.....	44	1.40
1000 Argenta.....	80c	100 Savage.....	11	1.10
2000 Alfa.....	70c	100 Seg Belcher.....	26	1.10
115 Alpha.....	104	100 St. Louis.....	30c	1.10
345 Alps.....	21	190 St. Louis.....	30c	1.10
220 Belcher.....	42	100 Succor.....	2.80	1.10
510 Bullion.....	184	100 Trojan.....	60c	1.10
185 Best & Belcher.....	184	100 Silver Hill.....	2.65	1.10
100 Bodie.....	15c	100 Utah.....	104	1.10
25 Baltimore Con.....	14	143 Union Con.....	56	1.10
50 Belmont.....	60c	100 Woodville.....	60c	1.10
300 Belle Isle.....	50c	100 Ward.....	1	1.10
140 California.....	284	300 Wells Fargo.....	10c	1.10
360 Con Virginia.....	224	50 Yellow Jacket.....	10c	1.10
20 Chollar.....	32c			
950 Crown Point.....	44	AFTERNOON SESSION.....		
20 Con Imperial.....	65c	100 Argenta.....	85c	1.10
270 Caledonia.....	2.30	100 Alfa.....	70c	1.10
60 DeFrees.....	75c	50 Alpha.....	104	1.10
1450 Day.....	90c	230 Alta.....	84c	1.10
380 Exchequer.....	3.60	700 Best & Belcher.....	194	1.10
310 Eureka Con.....	44	125 Belmont.....	104	1.10
100 Bodie.....	1.20	80 Bodie.....	10c	1.10
250 Falcon.....	84	300 Belle Isle.....	50c	1.10
140 Gould & Curry.....	84	500 Bullion.....	56	1.10
180 Gila.....	55	75 Bechtel.....	94	1.10
900 Grand Price.....	124	100 Bodine.....	104	1.10
50 Golden Charter.....	104	300 California.....	284	1.10
425 Grandeur.....	104	60 Confidence.....	60	1.10
1120 Hussey.....	1.40	300 Con Imperial.....	70c	1.10
440 Hale & Nor.....	104	60 DeFrees.....	45	1.10
450 Horne.....	104	100 DeFrees.....	45	1.10
350 Independence.....	104	185 Eureka Con.....	434	1.10
380 Justice.....	104	105 Exchequer.....	34	1.10
130 Julia.....	2.20	100 El Dorado S.....	35	1.10
275 Leeds.....	20	400 Falcon.....	104	1.10
1420 Leviathan.....	40c	450 Gila.....	60	1.10
850 Lexington.....	134	450 Gila.....	60	1.10
85 Mexican.....	134	100 Golden Char.....	80c	1.10
795 Modoc.....	50	1325 Gould & Curry.....	84	1.10
1000 Morning Star.....	104	100 Hussey.....	1.10	1.10
30 Manhattan.....	60	1050 Hornet.....	20c	1.10
1000 Mexican Water.....	60	240 Hale & Nor.....	104	1.10
1250 Narajo.....	1.95	500 Independent.....	1.05	1.10
450 New York.....	14	300 Justice.....	70c	1.10
90 Northern Belle.....	104	605 Leeds.....	104	1.10
225 Ochir.....	51	143 Leopard.....	35	1.10
1000 Panama.....	51	740 Modoc.....	50	1.10
500 Panther.....	50	1340 Nevada.....	134	1.10
20 Raymond & Ely.....	54	115 Nanbanan.....	104	1.10
100 Rye Patch.....	54	400 Meadow Valley.....	20c	1.10
300 Sierra Nevada.....	44	75 McCracken.....	44	1.10
185 Savage.....	114	2000 Nevada.....	1.95	1.10
50 Star.....	25	100 Nevada Belle.....	80c	1.10
850 Silver Price.....	90	100 New Coso.....	80c	1.10
475 Solid Silver.....	90	115 Ochir.....	53	1.10
100 Silver Hill.....	30	95 Overman.....	14	1.10
70 Senator.....	34	600 Panther.....	50	1.10
1125 Sucor.....	2.85	75 Raymond & Ely.....	104	1.10
100 Silver King.....	13	300 Silver Price.....	104	1.10
1000 St. Louis.....	104	125 St. King.....	134	1.10
500 Union.....	104	270 Sierra Nevada.....	4.20	1.10
400 Wells Fargo.....	10c	1200 Tiptop.....	34	1.10
1250 Ward.....	85c	200 Woodville.....	65c	1.10
400 Woodville.....	60c	100 Yellow Jacket.....	10c	1.10
1000 Yuma.....	104			
Monday A. M., Feb. 25.		Tuesday A. M., Feb. 26.		
60 Alpha.....	104	15 Alpha.....	104	1.10
850 Alta.....	84	215 Alta.....	84	1.10
300 Argenta.....	80c	45 Belcher.....	4.85	1.10
975 Best & Belcher.....	184	220 Best & Belcher.....	194	1.10
160 Belcher.....	4.80	280 Con Imperial.....	70	1.10
1230 Bullion.....	56	300 Crown Point.....	104	1.10
50 Baltimore Con.....	14	700 Bullion.....	56	1.10
55 California.....	284	700 Bullion.....	56	1.10
300 Con Virginia.....	224	700 Bullion.....	56	1.10
1115 Con Imperial.....	66	700 Bullion.....	56	1.10
285 Crown Point.....	4.55	700 Bullion.....	56	1.10
100 Day.....	24	700 Bullion.....	56	1.10
400 Day.....	11	700 Bullion.....	56	1.10
630 Exchequer.....	3.60	700 Bullion.....	56	1.10
100 Eureka Con.....	44	700 Bullion.....	56	1.10
350 Falcon.....	84	700 Bullion.....	56	1.10
300 Grand Price.....	124	700 Bullion.....	56	1.10
20 Hale & Nor.....	104	700 Bullion.....	56	1.10
1225 Justice.....	104	700 Bullion.....	56	1.10
225 Justice.....	104	700 Bullion.....	56	1.10
225 Justice.....	104	700 Bullion.....	56	1.10
225 Justice.....	104	700 Bullion.....	56	1.10
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A Unique and Interesting Work of Art.

(Written for the Press by J. W. A. W.)

Among the many curious and instructive objects to be seen in our deservedly popular Woodward's Gardens, is an unusual, and certainly meritorious work of art, now in process of completion, and one which naturally attracted especial attention about the 22d of February. It is an extra-colossal bust of Washington. Although begun January 7th, and though the artist constructing it has devoted to it his constant attention, it will not be entirely finished till late in March or early in April. Yet the face is so nearly completed that we recognize in it an admirable likeness already of the "Father of his Country."

We call it extra-colossal. To form an adequate idea of what we mean by the term as here applied, consider the following figures: The head alone is 5 feet 2 inches in length, the entire height of the bust being 11 feet. The shoulders measure 10 feet 4 inches across. When finished in plaster bronzed, or cast in solid bronze, it is to be placed on a pedestal 21 feet high, at a conspicuous point in the gardens. It is the work of Thomas Gagliardi, an Italian sculptor of skill and celebrity, from Rome, who came to California some two years ago. The work is entirely his own in design and structure, and follows Houdon's bust and Stewart's portrait—the best likenesses of Washington. He is daily at work upon the model in his shop near the bear-pit, and crowds of visitors watch its construction as it progresses. This adds another to the many valuable educational features of these gardens. The amount of potter's clay already used will enable your readers the better to appreciate its size. Although much of the framework is wood, there are now nearly five tons of clay in the model. Were it all made of clay, some 20 tons would be required. When this model is finished the cast will be taken in about seven pieces.

Mr. Gagliardi is a thoroughly trained sculptor, and has had much experience in this country. He was engaged for some years by Gen. Meigs on Government works in Washington City, executing in marble the model designed by Thomas Crawford for the tympanum of the Senate chamber, and the marble decorations in the banking room of the Treasury Department. He was really the author of the architectural part of the noted Lincoln monument, at Springfield, Illinois, though the statuary was made by Larkin G. Mead.

Mr. Gagliardi merely looks upon this admirable bust—which is many times larger than the colossal bust of Washington in the Centennial Memorial building—as a study for part of a colossal statue of Washington, 35 feet high, which he would like to see some day in bronze, mounted on a pedestal 15 feet high, say on Telegraph hill. There it would worthily be one of the first objects seen in the distance from vessels approaching our Queen City of the Pacific from the Golden Gate or across the bay. Certainly this is a fine conception, which the enterprising and patriotic people of San Francisco would do well to carry out. His estimate is that such a colossal statue, cast in bronze, would cost about \$60,000. It would be a merited tribute to our *Pater Patrie*, could every State possess one such monument to his greatness.

Mr. Gagliardi—as is always true of the genuine scientist—has an enthusiastic devotion to his noble art. California is fortunate in the possession of so accomplished a sculptor. He does his work equally well in clay or marble. Before coming here Mr. Gagliardi worked chiefly in marble, and his true profession was as a painter of statuary. It is only since his residence in San Francisco that he has devoted his attention to composing and modeling studies in his art. Hence he rightly claims to have been born in California as a sculptor. Last year he received a diploma from the Mechanics' fair. He deserves well the kind encouragement Mr. Woodward has given him.

He has lately made excellent busts of Mr. and Mrs. Woodward. One of his recent works is a fine statue of Medea, when she slew her two children in a fit of jealousy. Also a statue of Juarez, for Mazatlan, seven feet high, which can now be seen at W. T. Garratt's iron foundry, on Fremont street. It is to be hoped he will soon realize his wish to make for San Francisco, or California, his colossal statue of Washington. Popular criticism certainly gives him full credit for having successfully portrayed Washington's noble features in this huge bust. Every lover of art should see it.

While a heavy stick of timber was being lowered the other day into the Idaho mine, at Grass Valley, it slipped and fell 300 feet, killing George Poglase and James Buckett.

The last steamer from China brought but 28 Chinese passengers.

WOODWARD'S GARDENS has the following new attractions: The buffalo chase; large whale skeleton; new museum; improvements in the zoological department, besides the other features which have made it popular.

MODEL MAKER AND MACHINIST.—I. A. Heald, No. 514 Commercial St., San Francisco, (Fourth floor).

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

By Special Dispatch from Washington, D. C.

WEEK ENDING, FEBRUARY 12TH.

HYDRANTS.—Alvah C. Austin, Oakland, Cal.
SAW TEETH.—S. J. Randall and J. O'Brien, Port Ludlow, W. T.
FIRE ESCAPE.—I. D. Cross, Reno, Nevada.

TRADE-MARKS.
CIGARS.—(2), Liebos Bros. & Co., S. F.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.
NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

LEATHER.

(WHOLESALE.)
WEDNESDAY M., February 27, 1878.

Sole Leather, heavy, lb.	25 @ 29
Light.	22 @ 24
Jodot, 8 Kil. doz.	48 @ 50 00
11 to 13 Kil.	50 @ 52 00
14 to 16 Kil.	52 @ 54 00
Second Choice, 11 to 13 Kil.	55 @ 57 00
Cornellian, 12 to 15 Kil.	57 @ 59 00
Female, 12 to 13 Kil.	59 @ 61 00
14 to 16 Kil.	61 @ 63 00
Simon Union, Female, 12 to 13 Kil.	63 @ 65 00
14 to 15 Kil.	65 @ 67 00
15 to 17 Kil.	67 @ 69 00
Simon, 18 Kil.	69 @ 71 00
20 Kil.	71 @ 73 00
24 Kil.	73 @ 75 00
Robert, 7 and 9 Kil.	35 @ 40 00
Kips, French, lb.	1 00 @ 1 35
Cal. doz.	40 @ 50 00
French Sheep, all colors.	8 00 @ 15 00
Eastern Cal. for Backs, lb.	1 00 @ 1 25
Sheep Roams for Topping, all colors, doz.	9 00 @ 13 00
For Linings.	5 50 @ 10 50
Cal. Russet Sheep Linings.	1 75 @ 4 50
Boat Leas, French Cal. pair.	9 00 @ 10 00
Good French Cal.	4 00 @ 4 75
Best Jodot Cal.	5 00 @ 5 25
Leather, Harness, lb.	35 @ 38
Stirrup, lb.	43 @ 37
Wet, doz.	50 @ 65 00
Buff, doz.	18 @ 20
Wax Side.	17 @ 18

GENERAL MERCHANDISE.

(WHOLESALE.)
WEDNESDAY M., February 27, 1878.

RAGS.—Jobbing.	
Eng Standard Wheat, 107 @ 11	
Neville & Co's.	
Hand Sewed, 22x36, 107 @ 11	
22x40.	
Machine Sewed, 22x36, 107 @ 11	
Flour Sacks, halves, 107 @ 11	
Quarters.	
Elk Brand, 60 inch, 15 @	
Hessian, 60 inch, 15 @	
45 inch, 9 @	
40 inch, 9 @	
Wool Sacks, 34 1/2 @ 25	
4 lb doz.	
Machine Sewed, 47 @	
Standard Gunnies, 47 @	
Bean Brand, 61 @ 8	
CRYSTAL WAX.—17 @ 17	
Eagle.	
Patent Sperm, 25 @ 30	
CANNED GOODS.	
Assorted, 7 1/2 @ 7 3/4	
2 1/2 lb cans, 2 1/2 @ 3 00	
Table do, 3 1/2 @ 2 1/2	
Jams and Jellies, 4 @ 25	
Kidney, 1/2 gal., 3 @ 50	
Sardines, or box, 1 @ 81	
Hf Boxes, 3 @ 90	
Preserved Beef, 4 00 @	
2 1/2 lb doz, 2 1/2 @ 50	
Preserved Mutton, 4 00 @	
2 lb doz, 4 00 @	
Beef Tongue, 6 50 @	
Preserved Ham, 6 50 @	
2 lb doz, 6 50 @	
Deviled Ham, 1 lb, 5 50 @	
do Ham, 4 lb doz, 3 00 @	
CRYSTAL WAX.—Jobbing.	
Australian ton, 7 1/2 @ 8 00	
Coke Bay, 6 50 @ 7 00	
Bellingham Bay, 5 50 @	
Seattle, 7 00 @	
Cumbrland, 14 00 @	
Mt Diablo, 4 75 @ 5 75	
Lehigh, 22 00 @	
Liverpool, 7 00 @ 8 00	
West Hartley, 7 00 @ 8 00	
Scotch, 7 00 @ 8 00	
Scranton, 13 00 @ 15 00	
Vanover Id., 7 50 @	
Charcoal, sack, 7 50 @	
Coke, bbl, 60 @	
COFFEE.	
Sandwich Id. B, 21 @	
Costa Rica, 19 @ 19 1/2	
Guatemala, 19 @ 19 1/2	
Java, 19 @ 19 1/2	
Manila, 19 @ 19 1/2	
Ground, in ca, 25 @	
FISH.	
Sect to Dry Cod, 5 @ 5	
do in cases, 5 1/2 @ 7	
Eastern Cod, 7 00 @ 10 00	
Salmon, bbl, 9 00 @ 10 00	
Hf bbls, 4 75 @ 5 25	
2 lb cans, 3 10 @ 3 20	
Pkld Cod, bbls, 22 00 @	
Sardines, or box, 1 @ 81	
Macaroni, 11 00 @	
Hf Bbls, 11 50 @ 12 00	
In Kits, 3 00 @	
Excess, 3 75 @	
Pkld Herring, 3 00 @ 3 50	
Boston Smkd Hg, 40 @ 50	
LIME, ETC.	
Lime, Sta Cruz, 2 00 @ 2 25	
Cement, Rose, 2 75 @ 3 50	
Portland, 4 75 @ 5 50	

Plaster, Golden	
Gate Mills, 3 00 @ 3 25	
Land Plaster, in 10 @ 12 50	
NAILS.	
Assorted sizes, keg 3 @ 25 @ 4 00	
PAINTS.	
Pacific Blue, No 1, 00 @ 90	
Neatfoot, No 1, 00 @ 90	
Castor, No 1, 00 @ 90	
do No 2, 00 @ 90	
Castor, No 2, 00 @ 90	
Oliver, 25 @ 25 75	
Possel, 4 75 @ 25 75	
Palm, lb, 9 @	
Linsed, Raw, bbl, 77 @	
Boll, 25 @	
Cocoanut, 50 @	
China nut, 50 @ 70	
Sperm, 60 @ 65	
Coast, 60 @ 65	
Polar, refined, 27 @	
Lard, 10 @ 15	
Oleophine, 27 @	
Devos's Bril't, 27 @ 28 1/2	
Phosphor, 27 @	
Nonpareil, 50 @	
Eureka, 40 @ 42 1/2	
Barrel kerosene, 22 1/2 @ 25	
Downer Ker., 40 @ 42 1/2	
Elaine, 24 @	
PAINTS.	
Pure White Lead, 94 @ 104	
Whiting, 14 @ 5	
Putty, 4 @ 5	
Calc., 21 @ 3	
Ochre, 34 @	
Venetian Red, 34 @	
Averil Mixed, 34 @	
Paints, 34 @	
White & China, 2 00 @ 2 40	
Green, Blue & Yellow, 3 00 @ 3 50	
Light Red, 30 @ 33 50	
Metallic Roof, 30 @ 33 50	
RICE.	
China No. 1, B, 5 @ 8 1/2	
Hawian, 5 @ 8 1/2	
Cal. Bay, 10 @ 22 50	
Common, 10 @ 22 00	
Carmen Id., 13 00 @ 22 50	
Liverpool fine, 20 00 @ 22 50	
SOAP.	
Castle, lb, 10 @ 10 1/2	
Common brand, 10 @ 5	
Fancy brands, 7 @ 8	
SPICES.	
Onions, lb, 45 @ 50	
Cassia, 22 @ 25	
Nutmegs, 15 @ 30	
Pepper Grain, 15 @ 17	
Pimento, 15 @ 15	
Mustard, Cal., 1 50 @	
1 lb glass, 1 50 @	
SUGAR, ETC.	
Cal. Culu, 11 @ 12	
Powdered, 12 @	
Fine crushed, 11 @	
Granulated, 11 @	
Cal. Syrup, 70 @	
Hawaiian Molasses, 26 @ 30	
TEA.	
Young Hyson, 35 @ 50	
Koyune, etc., 35 @ 50	
Country pack, 50 @ 60	
Powder & Imperial, 50 @ 60	
Hyson, 35 @ 50	
Koyune, etc., 35 @ 50	
Japan, 1st quality, 40 @ 80	
2d quality, 25 @ 35	

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]
SAN FRANCISCO, February 27, 3 P. M.
LEGAL TENDERS IN S. F., 11 A. M., 98 @ 98 1/2. SILVER, 3 75 @ 3.25. GOLD IN NEW YORK, 101 1/2.
GOLD BARS, 99 @ 910. SILVER BARS, 8 @ 15 cent. discount.
EXCHANGE ON NEW YORK, 1/2; on London bankers, 49 1/2.
COMMERCIAL, 50; Paris, five francs @ dollar; Mexican dollars, 55.
LONDON CONSOLS 95 1/2; Bonds, 105 1/2.
QUICKSILVER IN S. F., by the sack, 5 lb, 46 @ 47 1/2.

METALS.

(WHOLESALE.)
WEDNESDAY, M., February 27, 1878.

IRON.—	
American Pig, ton.	28 00 @ 30 00
Scotch Pig, ton.	28 00 @ 30 00
White Pig, ton.	28 00 @ 30 00
Oregon Pig, ton.	28 00 @ 30 00
Red Hot Bar.	21 @ 31
Home Shoes, keg.	5 00 @ 7 1/2
Nail Rod.	— @ 7 1/2
Norway, Oval.	— @ 7 1/2
COPPER.	
Sheathing, lb.	34 @ 35
Sheathing, Yellow.	21 @
Sheathing, Old Yellow.	12 @
Composition Nails.	24 @
Composition Balls.	24 @
STEEL.—	
English Cast, lb.	13 @ 14
Anderson & Woods, ordinary sizes.	15 @ —
Drill.	15 @ —
Flat Bar.	14 @ 19
Plow Steel.	8 1/2 @ 12 1/2
TIN PLATES.	
10x14 1/2 Charcoal.	7 50 @ 8 50
Banca Tin.	23 @ 24
Australian.	17 @ 17 1/2
ZINC.	
By the Sack.	9 @ —
Sheet 7 1/2 x 14, 7 to 10 lb.	9 @ —
7 1/2 x 11 to 14.	10 @ —
8 1/2 x 8 to 10.	11 @ —
8 1/2 x 11 to 10.	11 @ —
Assorted sizes.	3 15 @ 3 25
QUICKSILVER.—	
By the lb.	43 @ 45

Signal Service Meteorological Report.

Week Ending February 26, 1878.

HIGHEST AND LOWEST BAROMETER.							
Feb. 20	Feb. 21	Feb. 22	Feb. 23	Feb. 24	Feb. 25	Feb. 26	
30.01	30.17	30.19	30.02	29.78	29.82	29.76	
29.70	30.00	30.14	29.65	29.67	29.73	29.50	
MINIMUM AND MAXIMUM THERMOMETER.							
59	58	58	59	58	57	53	
50	48	49	51	46	49	49	
MEAN DAILY HUMIDITY.							
60	60	74	81	63	61	81	
PREVAILING WIND.							
SW	NW	NE	SE	N	SW	SW	
WIND—MILES TRAVELLED.							
202	350	192	124	257	151	325	
STATE OF WEATHER.							
Fair.	Clear.	Clear.	Rainy.	Fair.	Fair.	Fair.	
.14			.60	.40		1.16	
Rainfall during the season, from July 1, 1877, 28.83 in.							

ANNOUNCEMENT.

SAN FRANCISCO, JANUARY 1st, 1878.
We beg to inform you that on the 12th, of the present month, Mr. Solon H. Williams, will be admitted as Junior Partner in our firm. The style and title of the new firm will then be Spaulding, Barto & Co.
Mr. W. has been connected with our establishment for several years past, and in introducing him, we trust that he will receive your confidence and respect.
In the future, as in the past, we will endeavor to give satisfaction to all those who favor us with their orders; and, as we have just added a large assortment of the latest and most beautiful founts of type to our already large stock, we are prepared to do any and all kinds of plain and fancy Job and Book work at Low Prices.
Soliciting a continuance of your favors, we are, yours respectfully,
SPaulding & Barto.

Information Wanted.—Any information as to the whereabouts of Mr. John Donohue, who left Ireland for Idaho City, in April, 1876, will be thankfully received by a friend that is inquiring for him. Address P. O. Box 2561, San Francisco, Cal.

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore.

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where he principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this act at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Dolores Consolidated Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Wilson Mining District, Contra Costa County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the twenty-fifth day of February, 1878, an assessment (No. 3) of three cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, 418 California Street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the fifth day of April, 1878, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the second day of May, A. D. 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, J. W. CLARK, Secy.
Office, Room 2, No. 418 California St., San Francisco, Cal.

Manzanita Consolidated Gravel Mining

Company. Location of works, Nevada County, California. Location of principal place of business, San Francisco, California.
Notice is hereby given, that at a meeting of the Directors, held on the nineteenth day of February, 1878, an assessment (No. 1) of twenty-five cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 8, No. 215 Sansome Street, San Francisco, Cal.
Any stock upon which this assessment shall remain unpaid on the twenty-sixth day of March, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the sixteenth

day of April, 1878, to pay said delinquent assessment, together with costs of advertising and expenses of sale.
THOS. J. OWENS, Secy.
Office, Room 6, No. 215 Sansome Street, San Francisco, Cal.

Summit Mining Company.—Location of

principal place of business, San Francisco, California. Location of works, Mineral Point Mining District, Plumas County, California.
Notice.—There is delinquent upon the following described stock, on account of assessment (No. 1), levied on the tenth day of December, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Aul, Geo.	130	200	\$10 00
Aul, Mrs. Geo.	133	200	10 00
Boring, J. C.	32	1200	60 00
Brown, M. B.	45	200	10 00
Hallsted, A. A.	121	500	25 00
Hallsted, A. A.	122	500	25 00
Hallsted, A. A.	123	500	25 00
Hallsted, A. A.	124	500	25 00
Hallsted, A. A.	125	500	25 00
Hallsted, A. D.	115	1250	62 02
Hallsted, A. D.	117	500	25 00
Hallsted, A. D.	118	500	25 00
Hallsted, A. D.	119	500	25 00
Hallsted, A. D.	120	500	25 00
Hallsted, A. D.	101	100	5 00
Hallsted, A. D.	102	100	5 00
Hallsted, A. D.	103	100	5 00
Hallsted, A. D.	104	100	5 00
Hallsted, A. D.	105	100	5 00
Hill, F.	37	200	10 00
Hallsted, Joseph.	100	200	10 00
Hallsted, Joseph.	107	200	10 00
Hallsted, Joseph.	108	200	10 00
Hallsted, Joseph.	109	200	10 00
Hallsted, Joseph.	110	200	10 00
Hallsted, Joseph.	111	200	10 00
Ingerson, H. H.	53	500	25 00
Long, J. O.	61	200	10 00
Long, J. O.	62	200	10 00
Leonard, F. A.	49	500	25 00
Martin, A., Trustee.	26	200	10 00
Martin, A., Trustee.	81	200	10 00
Martin, A., Trustee.	82	200	10 00
Martin, A., Trustee.	08	100	5 00
Martin, A., Trustee.	99	100	5 00
Martin, A., Trustee.	102	100	5 00
Martin, A., Trustee.	29	100	5 00
Quigley, Chas.	136	200	10 00
Oatman, J. E.	42	200	10 00
Oatman, E. F.	43	200	10 00
Peck, A. I.	114	4000	200 00
Peck, E. A., Trustee.	9	1000	50 00
Peck, E. A., Trustee.	69	100	5 00
Peck, E. A., Trustee.	70	100	5 00
Peck, E. A., Trustee.	71	100	5 00
Peck, E. A., Trustee.	72	50	2 50
Peck, E. A., Trustee.	73	50	2 50
Peck, E. A., Trustee.	74	200	10 00
Peck, E. A., Trustee.	112	200	10 00
Peck, E. A., Trustee.	113	200	10 00
Peck, E. A., Trustee.	152	500	25 00
Peck, E. A., Trustee.	153	250	12 50
Peck, E. A., Trustee.	154	1000	50 00
Purkitt, J. H.	51	500	25 00
Peck, A. I., Trustee.	155	3000	150 00
Turrell, M. H.	47	200	10 00
Turner, J. W.	63	200	10 00
Turner, J. W.	64	200	10 00
Turner, J. W.	65	200	10 00

Iron and Machine Works.

THOS. PENDERGAST.

HENRY S. SMITH

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

OF ALL KINDS.

Fremont Street, Bet. Howard and Folsom,

SAN FRANCISCO.

SHEET IRON PIPE.

Risdon Iron and Locomotive Works

Corner Howard and Beale Streets,

Are prepared to make SHEET IRON AND ASPHALTUM PIPE, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.

Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

JOSEPH MOORE, Superintendent.

PHELPS MANUFACTURING COMPANY,

Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

13, 15 & 17 Drumm St., near California,

SAN FRANCISCO, CAL.

SACRAMENTO BOILER WORKS,

37 Fremont St., cor. Mission, S. F.

HALL & KELSHAW,

PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

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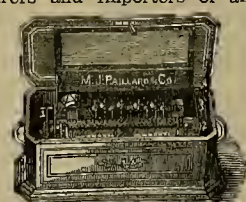
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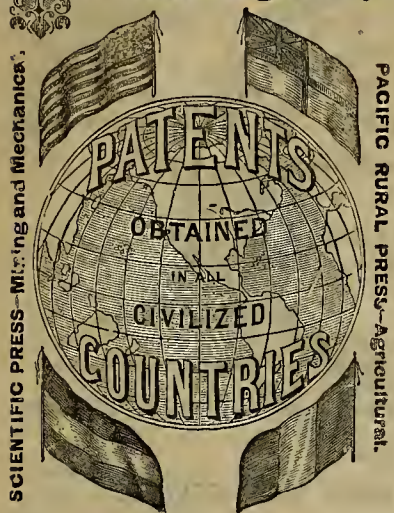
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Tunnel for Emptying Bear River.

A notable enterprise, though not of recent conception, has lately been set on foot. This consists of a tunnel to be run under the divide between Bear river and the North Fork of the American river, for the purpose of carrying off the immense deposits of tailings that have accumulated in the former, and discharging them into the latter. These tailings have been gathering in Bear river ever since gold washing commenced on that stream and its tributaries, and now amount to many million cubic yards. Five years ago a company was formed in this city for carrying out a project similar to this, but failed to prosecute it beyond its preliminary stages in consequence of their being unable to obtain title to all the ground by their field of contemplated operations. A new company, composed mostly of practical miners and business men residing at Dutch Flat and vicinity, was organized last summer for taking hold of this enterprise, and have since made all the surveys required, secured title to the necessary ground and got the entire business in good shape for practical operations. Prominent among the members of this new company are E. L. Bradley and M. S. Gardner, two of the earliest residents and most successful ditch men of Placer county, they being owners of over one-third of the property. The deposits secured by the company extend from the town of Dutch Flat down Bear river a distance of five miles, including one-half mile of the tailings on Steep Hollow, a branch of Bear river. The projected tunnel will commence at the lower end of this claim, and piercing the ridge open into Secret canyon one mile up from the point where it empties into the North Fork. This tunnel, which will start in 10 feet below the head of Bear river, and 50 feet below the surface of the tailings, will be 11,000 feet long, 12 feet wide and 10 feet high. It will have a grade of 2 1/2 inches to 12 feet, which will leave its lower end between 300 and 400 feet above the level of the North Fork, from which it will be distant one mile. In prosecuting this work it is proposed to sink a shaft one-half mile from its upper end, so that excavation can be carried on from three faces, two in the shaft and one from the lower end. It is calculated that its construction will require three years, machine drills being used, and involve an expenditure of \$350,000, outfit included.

The upper part of this tunnel, for a distance of five or six hundred feet, will be flumed, as along this section the heavier particles of gold will make lodgment. Should the bottom rock elsewhere be particularly soft, this also will be flumed or paved to protect it from erosion. The principal portion of the gold-saving apparatus, such as the undercurrents, secondaries and whatever other appliances may be provided for the purpose, will be placed below the tunnel, along Secret canyon, and extending down on the North Fork, should this be found necessary.

The tailings secured by this company, covering an area of some 600 acres to an average depth of 25 or 30 feet, are known to be rich in gold, both coarse and fine; some of it in a free state, some amalgamated with quicksilver and some held in the hard cement that occupies the bottoms of the buried rivers and other Pliocene water courses. As to the value of the gold contained in a cubic yard of this material, the best authorities differ slightly in their estimates, all being agreed, however, that it is ample to justify a large expenditure of money in the construction of a tunnel for collecting it in the manner here proposed. Among the best informed of the long resident miners about Dutch Flat and vicinity, it is generally believed that the deposits owned by the company contain gold and quicksilver to the value of \$11,000,000 at least, nine-tenths of which can be saved by re-washing at a very small cost, aside from the plant required to inaugurate operations.

The engineer of the San Francisco company before alluded to, computed the value of the tailings embraced in their claim at something

over \$30,000,000, the quantity being much larger than that owned by the present company. The amount to be realized from the tailings already deposited along these streams does not, however, measure their ultimate value, inasmuch as they are constantly receiving new accessions from the mines being worked in the neighborhood. There is, in fact, no such thing as exhausting them, they being from these sources constantly renewed. The productiveness of even these more recent deposits is well exemplified in the case of the various companies engaged in washing them, and whose annual clean-ups vary from \$20,000 to \$60,000, their works running wholly on tailings as they come fresh from the hydraulic claims, sometimes not more than two or three in number.

That an enterprise of this kind would pay well can hardly be doubted and the wonder is that it should have been suffered to slumber so long. There are elsewhere in the mining districts heavy deposits of these hydraulic tailings, though very few of them are, perhaps, so rich in gold as those along the head of Bear river. However this may be, certain it is, none possess the facilities that here exist for their ready utilization. In fact, they cannot, in more than a few localities, be moved at all, from want of outlet or fall. Owing to the circumstance that the head of Bear river lies something like 1,000

feet higher than that of the North Fork, from which it is separated by only a narrow ridge, this difficulty can here be easily overcome. All that is required to empty Bear river of the debris that now obstructs, is a passageway through this ridge, such as is here contemplated. This supplied and that stream can be not only cleaned out, but can be forever kept free from accumulations of this kind.

With some of the large hydraulic companies discharging into Bear river and its upper confluent, the construction of a tunnel like this will soon become a necessity, since without it the tailings will have so accumulated that they will, in the course of a few years, be obliged to suspend operations altogether. This prospective trouble ought to, as we believe it has, secured their active co-operation in the proposed work. This company having completed their surveys and secured title to their property, including the various franchises connected with outlet, etc., will commence operations at once, putting, first, a working face on the lower end of their tunnel, after which the shaft and other preliminary measures will be proceeded with.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Con. Virginia, Feb. 27th, \$161,829.21; California, 27th, \$243,263.33; Manhattan, 26th, \$7,369.77; Chollar, 27th, \$5,329.51; Christy, 27th, \$3,531; Christy, 28th, \$2,641; Tybo Con., 25th, \$9,422.75; Standard, 26th, \$21,608.39; Northern Belle, 25th, \$2,086.83; California, March 2d, \$369,711.91; Con. Virginia, 2d, \$148,372.34; Northern Belle Feb. 27th, \$2,034.88; Grand Prize, March 2d, \$22,800; Christy, 4th, \$1,582; Tybo Con., Feb. 27th, \$9,110.44; Christy, March 5th, \$1,593; Con. Virginia, 5th, \$176,618.88; Northern Belle, 2d, \$3,316.83; Young America, 6th, \$3,435.90.

The total amount of assessments collected by the 213 mines listed on the stock boards in different mining districts, during the past 13 years, are \$55,825,236. Aggregate amount of dividends paid \$108,915,699, leaving a balance of dividends over assessments of \$53,090,463.

An Improved Pipe Wrench.

We illustrate on this page an improved pipe wrench, just patented through the MINING AND SCIENTIFIC PRESS Patent Agency by Charles C. Coleman, of Honolulu, Hawaiian Islands. The novel combination of parts of this pipe wrench effects a more perfect enclosing grip than similar tools. The end of the handle is bent slightly back. At the angle where this bend occurs the larger curved jaw is hinged. To this a smaller curved jaw is hinged about midway in its length, so that with the corresponding portion of the large jaw, it forms when closed a nearly enclosing ring for the pipe or bar to which it is fitted.

A link unites the outer end of the handle with the outer end of the smaller curved jaw, so that when the jaws have been made to seize an object, the movement of the handle acts through the link, to press the jaws more closely together upon the pipe or bar.

The inner faces of the jaw are corrugated to prevent slipping, and a thread may also be cut across these corrugations, so that, when desired the wrench may be made to seize a nipple and



COLEMAN'S IMPROVED PIPE WRENCH.

screw it firmly to place without marring or injuring the thread. The jaws so nearly enclose the pipe that a very perfect grip may be had without any danger of crushing or breaking it; and the grip is increased with the power applied. Further information will be forwarded to those desiring it, by addressing the inventor as above.

DEATH OF A WELL-KNOWN CALIFORNIA ARTIST.—Charles Nahl, the well-known artist, died in this city, this week. Mr. Nahl was probably better known to the mining community generally than any other artist on the coast, as most of his best productions were scenes from a miner's life. In the early days of California, he worked the rocker and tom himself, lived the rough life of the mining camps of those times and made hundreds of characteristic sketches, which he worked up successfully in more quiet times. We have published, in the MINING AND SCIENTIFIC PRESS, a great number of engravings from the pencil of Mr. Nahl, which were all characterized by detailed knowledge of the subjects portrayed and skillful drawing. Many of his pictures will, no doubt, now become famous, although as yet but little known away from this coast. Mr. Nahl possessed the advantage of having lived among miners and been one of them himself, so that he was enabled to make truthful sketches illustrative of a miner's life in the "days of '49." These paintings, as well as those made of Panama scenery, would be recognized anywhere by California pioneers as having been made by a skillful hand, with knowledge of the subject.

THE AMERICAN ANTIQUARIAN, is an illustrated quarterly journal, devoted to early American history, archaeology, and ethnology, edited by the Rev. Stephen D. Peet, Ashtabula, Ohio; published by the Archaeological Exchange Club. Two dollars per year or 50 cents each number. It is the only magazine of the kind on the continent. The articles are all interesting and contain accounts of the latest discoveries. The illustrations picture ancient things of which we now know but little.

New Tunnel Project for Inyo County

The Independence Tunnel and Mining Company is the name of an incorporation recently formed, which owns a number of mines on the north side of Kearsarge mountain, Inyo county. The main design of the company is to open up, by a tunnel, the mines belonging to it. It will, however, also offer the neighboring mines the best advantages, enabling them to be worked by drifts connecting with the tunnel. The revenue thus arising from the transportation of ores from these mines to the mouth of the tunnel will, in due time, become a very important item in the income of the company, for it has been demonstrated that this is the only means by which the adjoining mines can be worked to any advantage. So important is the tunnel project to the successful working of the mines that it is considered for that section of country what the Sutro tunnel will be to the Comstock.

The tunnel has the best possible location for developing and controlling the principal mines of the district, the face of the tunnel being about 2,000 feet below the crest of the mountain, striking Mountain View mine 1,716 feet in depth, after running 3,036 feet, this being the deepest mine struck in the mountain, while the Rex Montis will be reached 1,320 feet from the surface. From this showing it can be readily seen that this enterprise will prove of immense advantage to the mines cut by this tunnel, as well as a decided revenue to the company. It is therefore the intention to commence work upon the said tunnel at an early day, and prosecute the same day and night until at least 3,000 feet is completed, the United States mining laws giving the company the right to all undiscovered veins or lodes for that distance from the mouth of the tunnel.

The main consideration at present, however, is the development of this company's property, consisting of the above mentioned mines, which will be worked during the progress of the tunnel from the surface, until the completion of the tunnel to the first lode—the Potosi No. 4—which thereafter will be worked by means of drifts in connection with the same tunnel.

The tunnel will strike the Potosi No. 4 in 700 feet at a depth of 415 feet. A shaft will be sunk to connect with the tunnel. Potosi No. 3 will be tapped at a depth of 630 feet when the tunnel is 1,100 feet long. It is proposed to immediately erect a 10-stamp mill about 2,500 feet below the mouth of the tunnel, which will be connected at an early day with a tramway of the most improved pattern. The water right owned by the company is considered sufficient to furnish all the power required to run 100 stamps. As each mine is opened the ore supply will increase, and as it does the number of stamps can be increased. The mines will be worked on a scale commensurate with their value, and all the improved appliances will be utilized, such as Burleigh drills, a Baldwin underground locomotive for the tunnel, etc. The ores of this district are of a high grade. The capital stock of the company is \$10,000,000 in 100,000 shares. The officers are: President, John Neate; Vice President, E. D. Farnsworth; Secretary, A. T. Crocker; Treasurer, Pacific Bank; Superintendent, J. H. Holt; Trustees, Geo. B. Hihard, John Neate, E. E. Farnsworth, J. J. Rey, S. C. Farnham. The offices are in the Stock Exchange building in this city. The pamphlet or prospectus from which we glean the above facts contains a lithograph of the valley and mountains where the company's property is located, and also a diagram of the proposed tunnel and various mines. The Inyo Independent thinks the scheme will undoubtedly command capital sufficient to complete the undertaking, and also that no mining scheme on the coast has better prospects of ultimate and certain success.

EX-PRESIDENT GRANT has gone to Constantinople.



CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

The Future of Copper Mining and Smelting on the Pacific Coast.

EDITORS PRESS.—I am surprised to find that so little progress has been made on the Pacific coast in this most important branch of mining. In 1872 I visited Calaveras county and the mines about Copperopolis, and saw there all the elements necessary for carrying on successful operations, both as to mining and smelting; at the same time I did not find that the requisite practical experience existed in all the branches of this business. The mines certainly were well worked, according to general practical experience, and one of the important departments in the reduction of copper ores, had been attempted, namely, the mechanical concentration of ores to a higher percentage. But this operation had not been planted according to the most improved systems. Especially, I noticed an absence of automatic contrivances, so important in carrying this operation on in an economical manner. The next defect that struck me, was the absence of furnaces, which, according to long experience in Chile, is considered the corner stone of success in the copper business. The concentration of copper ores by mechanical means very seldom raises the percentage thereof over 22%. The consequence is, four and a half to five tons, instead of one ton, have to be freighted to San Francisco and thence to Europe.

The great profit of copper mining is made, first, by mechanical concentration to 15% or 20%, and then smelting this ore to 75%, whereby freight is economized on four tons. This alone would constitute a great profit. This operation is carried on in Chile in reverberatory furnaces with wood fuel; very often of a most inferior kind; the writer having had to smelt copper ores in some localities with a species of sage brush, which exists in the deserts of northern Chile. The great advantage of this class of smelting, is the small outlay in plant, not exceeding, at most, \$1,500, and with that amount, the daily smelting of 15 to 20 tons of ore per day is carried out—being thus concentrated to about four tons of matter of 70%, a daily economy in freight of 15 tons. It has been found in Chile, the greatest copper-producing country of the world, that copper mining, in itself, is seldom remunerative, although there are exceptional cases. When copper in England was sold for £140 a ton, profits were made on ores of 20% shipped to England. However, those times are gone by, and for years past few shipments of ores have been made from Chile to that country, even when concentrated. Copper mining and smelting in Chile is looked upon by merchants and bankers as the safest kind of mining, ranking in this respect with ordinary commercial transactions. This business, however, is there so thoroughly and practically understood by most copper miners, that capitalists do not consider that it involves much risk, provided they are dealing with honest miners.

It is well known in Europe, that the greatest fortunes have there been realized both by natives and foreigners engaged in the copper business.

Chilean Copper Millionaires.

Last week we heard through the press of the death of a Chilean millionaire, Don Augustin Edwards, who leaves a fortune of \$25,000,000, having held the monopoly of copper for years. Don Jose Thomas Urmeneta has a fortune of about \$16,000,000, acquired through his copper mines in the district of Tamaya, Province of Coquimbo, where he has splendid smelting works and about 40 furnaces. Mr. Charles Lambert, another copper millionaire, arrived in Chile in 1830, a poor man. He died last year leaving \$5,000,000, in hard cash, besides his mines and smelting works in Chile and Swansea; these being but a few of the many successful operators in the copper mines of that country that might be mentioned. By way of illustrating the richness of the ores there, I give you the following facts touching the production of the Rosario mine, in the district of Tamaya, Coquimbo, for nine years—reaching from 1866 to 1875 inclusive. The average percentage of metal contained in the ores during this time, was 19; tons raised, 64,000; value, \$4,393,128, or, in round numbers, £850,000. When I was on this mine in August, 1876, the production for that month was 940 tons, average assay 21%. Mr. Urmeneta's mine, close to this and on the same vein, has produced thrice the above amount—180,000 tons, of an average of 32% during 15 years. I could give you a great many more examples of like purport were it necessary.

From a practical experience of 10 years in copper mining and smelting in Chile, I can safely assert, that if our capitalists on this coast paid more attention to this branch of mining, they would be amply rewarded for their outlay.

HENRY SEWELL, M. E.

DETERMINING IMPURITIES IN RIVER WATER.

—Dr. Vohl, of Cologne, has adopted an ingenious method of determining the impurities of the Rhine, which consists in analyzing the boiler incrustations of the river steamers, as well as the concentrated residues remaining in the boilers after passing over a given distance.

Picacho Mine and Peak.

Near the west bank of the Colorado, a short distance above Fort Yuma, a high crag shoots up to a great height above the mountain range in which it stands. Its sides are so steep (the eastern actually impending) that the early American explorers of this region gave to it the name of "Chimney" rock, from its resemblance to a structure of this kind. The Spaniards called it *El Picacho*, which in that tongue signifies "the point" or "peak." As you approach the river from almost any quarter, this towering rock, piercing the blue sky and overlooking the country far around, forms a picturesque and striking object, the view from the north being especially calculated to impress the traveler with its loneliness and grandeur. What adds to the interest of "El Picacho," with persons of a practical turn of mind, is the fact that it is traversed by a heavy belt of gold-bearing quartz, much of it of a sufficiently high grade to pay for extraction and milling. It was, in fact, the fine gold released from this lode and washed down and deposited in the ravines that traverse the sloping plain that skirts it on the east, which in part caused the excitement about that region in the summer of 1861, when many miners left California to engage in placer mining there. The diggings at this point, though richer than those at La Paz, further up and on the opposite side of the Colorado, failed to attract many people to them, there being no water in the neighborhood for gold washing. Some Mexicans, however, resorted to them, and being experts at dry washing, made fair and sometimes large wages. It was observed that all the gold lay to the east and south of this peak, showing conclusively that this was the source whence it came. The placers, which lay five or six miles back from the river, were at too great an elevation to admit of water being taken upon them in ditches; wherefore it was not long till they were nearly deserted, the Mexicans by their method of gold gathering having secured the richest and most accessible deposits. Some of these people then began to look about for the primary source of this fine gold, which, of course, they readily discovered. After this they erected arastras on the river, and packing down the richest ores worked them with profit. After a time the claims which they had taken up fell into the hands of J. S. Spann, who bought a five-stamp battery from the old Buena Vista mine, and an engine which had been landed at Castle Dome for a smelting furnace under the auspices of the late Thomas Selby, of San Francisco, and which had been thrown into the river by the caving in of the bank at high water. He had the machinery dug out at low water, but some of the pieces had settled into quicksand beyond resurrection. Mr. Poindexter, now mining in Pima county, was associated with Spann, but their joint capital was exhausted before they could get their mill to work. Samuel Purdy, Jr., then organized a company in San Francisco to buy and work the mine. They put things to running in good shape, but by bad management and ignorance of employees got a few thousand dollars in debt, became disgusted, and allowed the whole property to be sold under attachment. It now appears, from a statement made in the *Yuma Sentinel*, that the present owner of this property, encouraged by the favorable reports of experts sent to examine it, has repaired the old mill and resumed operations on the mine, with every prospect of success. The last clean-up gave 79 ounces of clean retorted gold bullion. All the bullion heretofore shipped has yielded a value of \$15 to \$16 per ounce. The rock worked has given an average return of about \$23 per ton. The ore is friable and readily crushed. The mine comprises some 9,000 feet along the ledge, besides 20 acres of placer ground which will pay to mill. The road is excellent and on a continuous down grade to the mill. Such good results have been obtained from the little old rickety battery, that it is now proposed to erect a new mill and work the property to greater advantage.

THE DISCOVERY OF TWO NEW METALS.—Prof. Herman announces the discovery of two new metals in a mineral called columbite, to which he proposes to give the names ilmenium and neptunium. It is somewhat remarkable that no fewer than eight different metals have been reported in this mineral, and half a dozen chemists have contended for as many different interpretations of the true constitution of the stone. Prof. Herman now adds to the confusion by insisting that all previous analysis were incorrect and that columbite contains the rare metals ilmenium and neptunium. It is not probable that the new metals will prove of immediate practical value, as they are too rare to be introduced in the arts.

HOGS IN CHICAGO.—No less than 2,101,000 hogs have been packed in Chicago since the 1st of November, says the *Railway Age*. This is by far the largest number reported for the corresponding period in any previous year. The increase over the last season was 670,243, or 32%. Of course, all the railways in this region have shared in the immense amount of traffic which these figures imply; and, taking 40 as the average number to a car, they imply that no less than 52,525 car-loads of hogs have arrived in Chicago within the last 100 days, an average of 525½ for every day, Sundays included.

Leaching Process.

While the leading mines paid a reasonable profit an industry was overlooked, ore, more properly speaking, thrown away, than in itself was far more profitable than pure lead. The value of ores was altogether controlled by its percentage of lead, and the "Reno rates" regulated its worth in silver. Ore containing no lead was useless if the percentage of silver was not enough to warrant its being shipped to Reno, and the Utah miner has sent his ores there, knowing what kind of ores pay.

Thousands of tons went over the dump as waste that couldn't be shipped anywhere. The smelters on the Jordan and at Sandy were masters of the situation as far as lead ores were concerned and the "Reno rates" ruled silver.

Eight or nine months ago, Mr. Gregg came to Prof. Holden, and told him he had a plan to work the low-grade ores of the Old Telegraph. Holden gave him an experimenting outfit at the mine, helped him with a little money, and, when 500 pounds of ore was successfully treated, Gregg got a contract to work Old Telegraph ore at \$8 per ton. He needed help, and Mr. Cushing, who was then running a hoot and shoe shop in Brigham City, came to his assistance. Men laughed at the idea of "making silver out of water," and put Cushing up for a poor, foolish shoemaker. After a while John Gamble bought into the firm, and it became, as it is now, Gregg, Cushing & Gamble.

Gregg picked out the old Brigham house—a deserted hotel—to begin his work in, and the reason the works at present cost about \$5,000, is that the place was not adapted to any business but a bawdy house and the building had to be almost torn down and fixed to suit the whims of the experimenter.

About 8,000 ounces of leached silver have been shipped from Gregg's works lately, on ores from the Old Telegraph mine.

In order to keep our readers posted, we sent our reporter to Brigham to inspect the works and the following is the result.

The process of leaching is done in a wooden tank. For reasons best known to the inventor, nothing but red wood is used in the manufactory of these tanks. This tank is filled with ore crushed and passed through No. 30 screen. The liquid is then poured on and in about two hours drawn off beneath into what are called precipitating tanks. When the liquid is all drawn off the silver that was in the ore passes off with it in solution. When the precipitating tank is full, a chemical is put in which precipitates the silver in the shape of black sulphides. This is then put into flannel sacks, and another chemical added to carry off the base, strained and put into an oven and dried, then into a roaster and made into a matte, when it is ready for the crucible and the market.

The leaching works of Gregg, Cushing & Gamble, can turn out 75 tons of ore daily. The ore worked there at present contains about 18 ounces of silver and six per cent. lead. Ninety-five per cent. of the silver is saved and the lead lost. Any mine owner in the Territory can easily calculate what the result of this process will be if introduced all over our extensive mining region. We know that in the Cottonwoods, Alta, Obpir, Dry Canyon and Brigham, are dumps that contain more wealth in the low grade silver ores than their owners ever realized on their first-class ores.

The cost of leaching a ton of ore after it gets to the works is less than \$3 a ton. The chemicals used are good for all the time, as they are pumped up into the tanks after the sulphides have been precipitated.

Mining men should call at this office and see samples of the ore, sulphides, matte and pure silver as they were taken out of the works and they can then understand the revolution this invention is about to create in mining matters on this coast and particularly in Utah.—*Salt Lake Tribune*.

HERMAN EHRENBURG.—Concerning this Texas and Pacific coast pioneer, the *Arizona Sentinel* remarks as follows: Herman Ehrenburg was no ordinary man. He came to the United States at an early age and worked his way to New Orleans, where he was located when the Texas war summoned him with others to activity. He enlisted in the "New Orleans Grays," and was present at the battle of Goliad and Fanning's defeat, and was one of the few who survived the barbarous massacre of prisoners who surrendered to the Mexican authorities. At the close of the Texan struggle he returned to Germany, and wrote an account in his native language of that interesting period, giving much information of the new country, which has induced a large emigration of Germans to Texas. He afterward returned to the United States and, in 1840, at St. Louis, joined a party which crossed the continent to Oregon. Thence he went to the Sandwich Islands, and after wandering in Polynesia a few years returned to California in time to join Colonel Fremont in the effort to free California from Mexican rule. He remained in California until the Gadsden purchase attracted his restless nature. In 1856 he settled near Tubac and engaged in working the silver mines in the Santa Rita mountains, Arizica, Cerro Colorado and other parts of the Territory. He was a civil engineer and scientist of more than ordinary reputation and ability. The town of Ehrenberg, Yuma county, was laid out by and named after him. He was killed at Palm springs, on the California desert.

State of Colorado.

A correspondent of the *Salt Lake Tribune* writes as follows: Colorado and Utah possess in climate, soil, elevation, hills and plains, great similarity, hence the industries of one should bring much the same results as the other. Colorado has become renowned as a stock country, and Utah should become equally so.

The death of Mr. John W. Ibb, known as the "cattle king," has brought out some facts that show the remarkable success of judicious and intelligent management. In 1865, Mr. Ibb started with a small herd of cattle, in which was invested his all. At his death a few days ago, he left his family about 30,000 head of cattle, with other property, making an estate of nearly, if not quite, \$1,000,000. His ranges were on the plains and foothills of northern Colorado and southern Wyoming, near the line of the Union Pacific railroad.

In talking with men here engaged in stock raising, they advise what is called mixed herds, as the most profitable, and claim that cattle should not be sold from the herd until fully matured and fattened. The cost of herding or looking after cattle is about the same with a small number that is with a greater number, hence to succeed well where cattle run on open ranges, it must either require large capital or the herding must be done by the union of small herds into one large one, to bring down the cost per head. Through the system of branding usually employed, this may be readily done, and each man secure his rights in such co-operation. While cattle seem to be the favorite stock in Colorado, sheep and horses have their favorite champions. It is claimed that not one failure has occurred among stock growers in Colorado who had persistence to remain in the business three or four years; and they also claim that to engage in this industry for one or two years seldom net the parties any returns. What is being done in Colorado, can be done in Utah, and I hope to see many more embark in the business than we now have in our State.

In crossing some of the mountains near here, I was surprised to find ground upon which potatoes and some of the hardy vegetables are yearly raised, along the slope and at an elevation of between 9,000 and 10,000 feet above the sea. Ranchmen tell me they have done well, in this high culture, where a hank of snow a few rods off furnishes moisture in abundance for their crops.

ANOTHER CONTRIVANCE TO PROTECT THE MINERS.—Thomas Kelly, of Virginia City, has perfected another apparatus for the prevention of accidents in case of overwinding at hoisting works. It is undoubtedly a fine invention, as it not only unbooks the cable from the cage before it has ascended to the sheaves, but also takes care of the cable, carrying it back to the reel just as though nothing had happened. It is in this that Mr. Kelly's invention surpasses all others. By simple and certain means the end of the hoisting cable is no sooner detached from the cage than there is spliced to it the end of another cable hanging in readiness on a reel. This last mentioned cable goes up over the sheave and safely conducts back to the reel the main cable. The supplementary cable passes off a reel to which is attached a brake, which only allows it to be paid out under a pressure of two tons; therefore the main cable is drawn back to its reel under the same tension that it would have were the cage still attached to it. But for this arrangement, by means of which the cable is safely conducted home, it would be liable to whip back on being detached from the cage with such force as to injure the hoisting frame, the joints and ceilings of the building, or break in pieces anything with which it came in contact; also, it would kill or wound any men that might happen to be in the way. With Mr. Kelly's apparatus any men that might be on a cage would be quite secure in case of overwinding, provided the safety of the cage itself were in good working condition, and in this respect there is no trouble. Mr. Kelly has applied for a patent for his invention.—*Gold Hill News*.

RAPID WORK.—At the North Consolidated Virginia mine they have placed a partition in their main shaft for the purpose of producing therein a circulation of air. This partition was completed night before last and is found to work admirably; the air passing down on one side of it and up on the other. It extends from top to the bottom of the shaft, a distance of 1,300 feet, and was put up in place in the short space of twelve hours. This is about as quick work as has ever been done on the Comstock. Now, that these partitions in shafts are found to work well we shall doubtless hear of more of them being placed in shafts and inclines. They cost but little and are never in the way. By placing a partition in a large double track drift the same effect would be produced, and in a narrow drift a tight floor may be laid with an air chamber under it.—*Virginia Enterprise*.

NEW LOCALITIES OF PETROLEUM.—A new attraction to the Black Hills region is announced. It is said that oil has been struck there, at a locality 100 miles south of Deadwood. The California oil wells are rapidly increasing their number, and the total production begins to be of importance. This oil is, in various particulars, better than that of Pennsylvania; in one instance it can be used for lamps without refining, and is so used, just as it comes from the well.

MECHANICAL PROGRESS.

Another Attempt at Fuel Economy.

Mr. B. T. Babbitt, of New York, recently purchased a locomotive, which he has been fitting up at Whitesboro, N. Y., to test some improvements designed by him, which are thus described by the *Utica Herald*: "Beginning at the front, the smoke bonnet has been lengthened sufficient to permit the introduction of a large coil of pipe, through which the feed-water from the tender is forced, and as the pipe is exposed to the hot products of combustion as they come through the boiler tubes, it is expected the feed-water will be heated nearly to the boiling point before it enters the boiler, thus effecting a large saving in fuel. The most noticeable change will be found in the smoke stack. This, instead of being the usual kind, consists of a cylinder of boiler iron about four feet in diameter and about six feet high. This is filled with a multitude of small tubes—similar to an upright tubular boiler—through which the smoke and heat pass up and off. At the top of this cylinder, on front and rear, are large openings fitted with valves that are operated from the cab. From the bottom of the stack a large iron pipe extends down around the boiler and connects with the front of the ash-pan. The action is to be as follows:—The cold, outside air will be admitted to the interior of the smoke-stack through the upper openings, and coming in contact with the small tubes, which are highly heated by the hot gases passing through them, will in turn have its temperature raised to a high degree, and will pass down through the lower pipe and be discharged into the ash-pan beneath the fire, thus creating a hot blast, which is of admitted economy. The same principle applied at the establishment of Mr. Babbitt, in New York, has effected a saving of 35% in fuel. The ash-pan differs from the usual style in being arranged so that all openings can be tightly closed to exclude cold air, and are controlled from the cab. There is also a small pipe leading from the ash-pan to a point above the fire in the fire-box, enabling sufficient hot air to be introduced over the fire to insure free combustion of the gases liberated by heat. With a few minor exceptions, the engine otherwise does not differ from the usual style."

A RURAL MECHANIC.—A farm servant, residing near Eyemouth, England, has executed a piece of art workmanship of a peculiar character. It is a representation of the fountain of Helicon. The fountain, which is of octagonal form, is made entirely of boxwood, and is about five feet in height, and three and one-half feet in diameter. Entrance to the sacred fountain is gained by four stairs, at the top landing of which are gateways, each of which are guarded by chimeras or griffins, and between each stair are two small fountains representing water flowing into the mouth of nymphs. Between each fountain again is a balustrade formed of dolphins, of which there are 156. A promenade surrounds the lower basin, in which fish, seals and crocodiles may be seen playing in the water. Rising from this basin are zoophoric pillars (pillars resting on the backs of animals) surmounted with vases, and supporting another basin, on the margin of which waterfowls and other animals may be seen lying. Behind each of the vases stands a zoophoric column, and between each of these are panels on which is carved scenes derived from mythology. The fourth tier is supported by four zoophoric pillars, and is surrounded by Jove's messengers, one being placed on each column, while the fifth is a device surmounted by Jove himself, with oak foliage suspended from the heads of eagles. The carving is very delicately done. The figures placed in the different positions on the fountain are in number as follows: Human figures, 60; nymphs, 220; griffins 248; dolphins, 205; birds, 50; and horses, 20. The work will be on view in the Edinburgh industrial museum for some time prior to its being sent to the exhibition at Paris.

SUNDAY ON THE RAILWAY.—The following advertisement appears in some of the English papers. Perhaps some of our readers who feel strongly on the subject of Sunday labor by railway employees, would like to try their hands in competing for the \$600 in prizes: "The International Federation of Lord's Day Societies offers £120 in prizes (the first not to be less than £30) for a literary work, 'On the Sunday Toil of Public Servants, Especially on Railways.' Full prospectuses of the competition may be had on application (with stamped addressed cover) to either of the honorary secretaries of the English Central Committee of the Federation, Rev. John Gritton, 20 John street, Adelphi, London, W. C.; Mr. Charles Hill, 13 Bedford Row."

MR. HENRY BESSEMER.—The inventor of the Bessemer process, Mr. Henry Bessemer, M. I. C. E., has just received another mark of the recognition of the Institution of Civil Engineers, of the great value of his invention, by the award to him of the first Howard quinquennial prize, as—in terms of the bequest—the inventor of a new and valuable process relating to the uses and properties of iron. The first public description of that invention was communicated to the Institution of Civil Engineers in the year 1859, and for the paper—"On the Manufacture of Malleable Iron and Steel"—then submitted, a Telford medal was awarded.

STEEL BOILERS.—The report of Mr. William Parker and Mr. James Milton, Chief-Engineer-Surveyor, and Engineer of Lloyd's, on steel boilers, is described by *Iron* as an important and carefully-prepared document. After a careful enumeration of the experiments made and the evidence collected, the conclusion is arrived at that, "in the construction of steel boilers, greater care and attention must be exercised with the workmanship than is required in the case of iron boilers;" that, although the corrosion of the steel boilers examined is excessive, they may, "if made with the care that this material requires," eventually prove as durable as iron boilers, and that it will be a question whether a considerable reduction in the factor of safety may not be found compatible with perfect safety and efficiency. It is therefore recommended that a reduction from the scantlings prescribed by the rules for iron boilers he made in the shell plates and stay to the extent of 25%, and in the flat plates, not subject to the action of heat, to the extent of 12%, on condition that the material have an ultimate tensile strength of not less than 26 and not more than 30 tons per square inch of section; that a strip cut from every plate be tested; that the holes be drilled, or if punched, the plates be afterwards annealed; that all plates, except those in compression, that are dished or flanged, be afterwards annealed, and that the boilers be tested to not less than twice their working pressure.

MINIATURE WATER WORKS.—The *Engineering News* gives the following interesting account of a miniature town water works, in which many of our readers will be interested. Blue Island is a suburb of Chicago of about a thousand population. To towns of similar magnitude, the following account of the water works may be of interest. The works consist of a well, sunk at a cost of \$306; a frost-proof stone tower, 50 feet high, costing \$1,650; a tank weighing 10 tons, 18 feet high, 24 feet in diameter, and holding 58,600 gallons; and a windmill, 20 feet in diameter, having the power to lift 15 gallons per minute 90 feet high. The water has a pressure of 35 pounds to the square inch, and hydrants are attached to a six-inch stand pipe connected with the tank at the bottom. The hydrants are supplied with two-inch hose in such a manner that in case of fire the whole pressure can be turned on one hydrant in a few seconds. It is proposed that the water mains shall extend from the town east on Vermont street to Western avenue, thence north and south. The Blue Islanders are very proud of this miniature water works.

STRENGTH OF COMPOUND STEEL PLATES.—Some important experiments, says *Iron*, have just been made as to the solidity of a compound iron and steel plate made by Messrs. John Brown & Co., Sheffield, and although the trials have not been completed the results hitherto attained will go far to settle the question of the best armor for the future. The plate, which measured 8 feet by 6 feet 6 inches by 9 inches, was tested by the war Department at Shoeburyness with excellent results. It was fired at under the ordinary conditions of test with a full charge of 30 pounds of powder. The first shot, near the top edge, and the two subsequent ones, lower down, produced an average indentation of six inches. There was a slight crack made by the first shot, probably caused by its proximity to the edge of the plate. There was absolutely no sign of separation between the iron and the steel, which were equal in thickness.

SOUTHERN MANUFACTURING PROGRESS.—As fine and as beautiful yarns, says the *Chicago Journal of Commerce*, with as many ounces to the spindle, have been, and can be, spun in the South as in any place in the world. The large mill at Augusta, Georgia, is instanced as one of the best appointed, best conducted and most successful mills in the United States and pays the largest dividends on the manufacture of plain cottons. It produces 60 yards of heavy goods a day to each loom, which is 17 yards better than its New England competitors. The fabrics have found a ready demand in New York upon the same counters with the Eastern goods.

TUBULAR BOILERS.—The invention of Mr. John Furness, of Huddersfield, England, consists in the employment of tubes of different diameters in the flues of such boilers. He first inserts a series of locomotive or narrow tubes and then a series of Galloway tubes, and so on alternately the whole length of the flue. Boilers thus constructed combine, he says, the advantages of an ordinary Galloway boiler with those of a locomotive, and afford increased heating surface and a saving in the cost of construction.

RAILROAD EARNINGS.—The earnings of the railroads in the United States were the smallest last year ever made. As the earnings of these roads reflect very truthfully the average prosperity of the country, the past must be accepted as the poorest business year we have ever yet experienced. Towards the end of the year, railroad traffic began to improve and has since been increasing at a rate that indicates a greater prosperity for the current year.

CARBOLIC ACID is recommended for moistening the tools with which metals are worked. The duty of the grindstone is even said to be increased by the use of the acid. The dark and impure acid can be used for this purpose.

SCIENTIFIC PROGRESS.

The Future of the Grasshopper.

EDITORS PRESS:—The following passage taken from the close of the introduction of the report of the U. S. Entomological Commission, now going through the press, will be read with interest. The term "temporary region" refers to the fertile country beyond the Mississippi and south of the 40th parallel, which is more particularly subject to grasshopper ravages; and the confident and encouraging statements of the Commission will relieve any anxiety as to the future of that rich agricultural region: "We cannot well close this introduction without some statement of our views as to the locust prospects for the immediate future, since our opinions are constantly being asked for. That the insect will, in the future, again pour down at times from its breeding grounds into the temporary region, unless by the co-operation of the two governments interested it is prevented from so doing by the course we recommend or by some still more feasible course yet to be discovered, there can be no reasonable doubt, yet in proportion as the country becomes settled will the locust injury be more and more easily controlled. But we do not hesitate to give it as our deliberate opinion that there will be no serious injury in each temporary region the coming summer, and probably not for several years to come. We rest this conclusion, firstly, on our personal examinations the past autumn over much of the country named; secondly, on the reports of correspondents in said country; and thirdly, on the reports from the extreme northwest on permanent region. These show that none of the insects of any consequence that hatched in the temporary region remained to lay eggs; that scarcely any eggs were laid by the scattering autumn swarms, and that with few exceptions the permanent region east of the mountains is likewise remarkably free of eggs. S. Washington, D. C., Feb. 20th.

Disease Germs in San Francisco Sewer Gas.

Prof. George Davidson, in the course of a recent article on sewer gas, gives the following record of investigations made in this city. Glycerined glass plates were exposed in the sewer near the Palace hotel, where the exhaust steam enters the sewers, and yet the following results were obtained by two microscopists: Examined soon after the washing was made, a sedimentary deposit of vegetable fibers and other matters was noticeable to the unaided vision. Drops placed under a microscope, with an amplification of from 300 to 1,300 diameters, were found to contain vegetable cell structure, spiral ducts and fungus spores.

Bacteria, one of the earliest vegetable forms appearing in decaying and putrefying animal and vegetable solutions, and by many regarded as the cause of putrefaction and zymotic diseases, were found in large numbers.

Spirilla were also discovered, but not plentifully. A growing fungus, somewhat aborescent in form and answering to *Torula*, found in decomposing urine, was noticed in many instances, the filamentous mycelium spreading in all directions.

Monad-like forms were plentiful, which were probably the zoospores of some of the lower algae, and a few spiral filaments, answering to the description of *gyrocerus*, of the genus *Torula*, were found. These forms are all found in decomposing and fermenting solutions and matter, and their presence would seem to prove that the gases arising from our sewers are laden with the seeds of disease and death to such an extent as to contaminate the purest air and water.

Without doubt diphtheria and other diseases of a material character would be lessened by the destruction of such germs as are known to be their cause or stimulant, and it would seem proven, from this and other tests made, that to this end our sewers gas should be made a point of vigorous attack.

MEN WITH SHARP EYES.—Few persons have strong enough eyes to see certain planets without glasses. Kepler mentions some person who could see 14, and Littrow one who could see 16 stars of the Pleiades, when ordinary people see only six. Mr. Q. M. Ward, an amateur astronomer in the north of Ireland, is known among scientific men for having viewed two of the four moons of Uranus with so small and simple a help as a four-inch telescope. In this country, Mr. S. W. Burnham, of Chicago, is noted for the particularly acute vision which reveals to him double stars, and astronomers of other lands often call upon him to decide vexed questions relating to these stars.

NEW JERSEY GLACIERS.—Prof. Geo. H. Cook has just published a small map of New Jersey, delineating the southern border of the moraines marking the southern limit of the continental ice-sheet. It starts at Perth Amboy, proceeds a little west of north to Dover, thence westerly and south of west nearly to Easton, on the Delaware river. It extended further south along the Hudson and Delaware rivers on account of the topography. The limit is very distinctly marked by numerous terminal moraines and the cessation of dome-shaped striated ledgers. It seems clear that this terminal moraine is traceable from New Jersey easterly across Staten, Long and the Elizabeth islands, to Plymouth county, Massachusetts.

The Murderer's Image in the Victim's Eye.

At the last meeting of the San Francisco Microscopical Society, President Hyde gave a cogent summary of this recent remarkable discovery of Professors Boll, of Rome, and Kuhne, of Heidelberg, in the anatomy and physiology of this eye. He said that the popular notion that the murderer's image is found photographed as it were on the retina of his victim's eyes may have some foundation in fact, viewed in the light of these recent discoveries, especially those of Dr. Kuhne. Histologists have always considered the rods and cones of the retina, which are taken to be the terminal organs of the optic nerve, to be in a natural condition when under examination. Prof. Boll found, however, that when the animal, say a frog, is killed rapidly and the retina viewed as quickly as possible, it has peculiarities never before observed and throwing new light on the physiology of vision.

Since the experiments of Dr. Kuhne are more elaborate and extensive than those of Prof. Boll, a sketch of them will be most instructive. Prof. Boll found that the newly removed retina had a rosy purple tint, which was difficult to examine, because exposure to light changed it in ten seconds to a satiny luster, and then after 15 minutes of transparency to a turbid opacity. Dr. Kuhne discovered that if kept in the dark, in sodium (yellow) light, the delicate "vision purple" of the removed retina could be retained as long as wished, thus making a series of very original and incisive experiments possible. It is proved that the retina contains a substance which, under the influence of light, undergoes a chemical change varying in intensity with the intensity and character of the luminous rays. In the living retina there is some process which restores to this substance its responsiveness to light as fast as it loses it by the action of light—a continual recharging with powder, as it were, of the retinal batteries which the impact of light waves is continually firing whilst vision continues. But after death, or removal of the retina, the gunner—the faithful heart with its supply of nutrient blood—having ceased his work, the last charge is fired and the batteries stand emptied. So, the light waves remove the color from the isolated retina in a few moments, unless they be shut out by darkness, then the retina can be kept in its natural condition, purple colored, the batteries ready charged to signal to the brain by their discharge the impact of the first light wave. Having thus the power of keeping retinas just as they leave the eye, by immersing them in darkness, or yellow light, very much as the photographer takes his negative from the camera and preserves and finally fixes the image, working at it always by yellow gaslight. Kuhne also preserved the images that were in the natural photographic plate, the retina of the natural camera, the eye, and actually fixed these images—by soaking them in a solution of alum. Thus he would fix the head and one of the eyeballs of a living rabbit opposite a bright skylight, cover it with a black cloth for five minutes, then remove the cloth, exposing the eye a few minutes, immediately remove the eye, soak in alum, and, upon examining the retina, find a beautifully accurate image of the skylight, showing its separate parts, the boards, etc. Even the eye in a severed head gave these results. The images were generally of a rosy hue.

Now, while this proves that images of objects seen before death may be found on the retina after death, yet, since to make this possible, the eye and the object must be perfectly still for some minutes, and the light must be strong. It probably never has happened, and never will happen that the image of the murderer is found in the eye of his victim, murder being a deed of darkness, and a deed tending to anything but immovableness in those enacting it.

NEW THEORY CONCERNING FEVER.—A series of experiments have been made by Dr. Horatio C. Wood, Jr., of Philadelphia. The expense of the investigation is borne by the Smithsonian Institution. The experiments indicate that the rapid fall of animal temperature which takes place after section of the spinal cord, is due to paralysis of the coats of the arteries, causing their expansion; whence results an increased flow of blood to the surface of the body, and a consequent reduction of the interior heat. Fever, under this theory, is a disturbance of equilibrium between the heat producing and the heat cooling powers of the body. The difference of medical practice that may result from adopting the theory, can be exemplified by the treatment it suggests for sunstroke. If the patient is in collapse, the hot bath should be applied; if thermic fever has supervened, the cold bath is required. In the first case, enveloping with a higher external temperature may save life; in the second case, cold surroundings may be similarly effective.

COLOR BLINDNESS.—Color blindness is still the subject of much investigation in Europe, with somewhat surprising results. On one French railroad 1,050 men, from 18 to 50 years of age, were examined from July, 1873, to October, 1876, on objects of color, violet, green, blue, yellow and red. Ninety-eight, or nearly 10 per cent., mistook at least one of these colors. The errors made: Concerning violet, 78; blue, 59; green, 54; yellow, 14; red, 10. Twenty-nine gave correct answers "after repeated hesitations," and eight corrected mistakes afterward. Only 11 of the whole number were rejected for color blindness.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

THE ADVANCE.—*Chronicle*, Feb. 23: We bear good accounts from this mine through disinterested parties. Very rich ore has been and is being taken out, and this week a large quantity has been shipped to the office at San Francisco. Assays made by B. E. Hunter, of Monitor, went over \$400 to the ton.

BUTTE.

GRAVEL ELEVATOR.—*Mercury*, March 1: A new mine is being put in order for work near Wyandotte, by the Wyandotte Hydraulic G. M. Co. It is the Frost & Rutherford claim, and one of the richest gravel mines in the county. The only trouble in working it has been the want of a good dump. The company has now gone to work and procured an elevator to be used at the mine, and with the pressure that it has will be able to wash the gravel to the bedrock. It has abundant means to put the mine into first-rate condition, and it will be able to get water the year round at reasonable rates.

The prospects for the small miners was never better in this State. There is an abundance of snow in the mountains, and there is also an abundance of ground to be had by merely taking it up. The dust will commence to come in pretty soon.

EL DORADO.

The Keegan tunnel, in 95 feet is being rapidly pushed and good looking ore is being taken from the mine. Prof. Price, general manager of the El Dorado Water and Deep Gravel mining company, announces that the company will hereafter be able to furnish from 10,000 to 12,000 inches of water per day of ten hours, and that it will be their policy to supply all who need it, either for mining or irrigating purposes, suspending operations on their own mines when the water is wanted by and can be sold to customers. He avows an earnest disposition to foster and build up the mining and agricultural interests of the county. It being the fixed purpose of the company to prevent anything like favoritism in the disposition of water, either to miner or farmers.

INYO.

NO REDUCTION OF WAGES.—*Coso News*, Feb. 23: J. J. Williams, recently appointed smelter for the New Coso company's mine, having by order of the directors attempted to reduce furnacemen's wages below \$4 per day was defeated in that purpose, the men refusing to work finally obliged him to leave the camp. The course adopted by the workmen met with the approval of all classes about Darwin.

UNION CON.—*Inyo Independent*, Feb. 23: At a late meeting of this company, their indebtedness was shown to be \$100,000, \$75,000 of which was incurred for the new shaft and \$18,000 for repairing damages caused by fire, \$40,000 having been assumed at the time of the consolidation for furnaces, wood, coal, etc., received. But one furnace was run last year. In January last, its output was about 140 tons of high-grade bullion. For the present month, the furnace was shut down on the 1st, from a lack of lead ore, and so continued until the 12th, a new water-jacket being put in place in the meanwhile. Somewhat less than the usual amount of work is going on at the mine. There is now a little ore most everywhere in the new works, enough to keep at least the one furnace running. The Union ledge proper has not as yet been tapped by the drift from the new shaft. When this is done the question of a deep bonanza will be quickly settled.

THE EFFECT.—The vast reduction in the price of lead has had serious effect upon some of our heaviest companies. The Union Con. suffered a loss of \$60,000 from this cause during the past year. At Darwin, a furnace producing 10 tons of bullion per day, loses just \$350. In other words, where a ton of bullion formerly realized \$25 over and above transportation, it now takes \$10 more than the lead is worth to market it. Since it costs \$40 per ton in San Francisco to refine the bullion, or separate the lead and silver, it is but small wonder that this class of industry is suffering in Inyo.

NEVADA.

WATT.—*Transcript*, March 1: The shaft on this gravel mine, a most difficult work, has been successfully carried through the treacherous quicksands, and at last entered a strong body of clay and all the indications are favorable that the center of the channel is close at hand. The shaft is down 323 feet, is in a splendid condition, and will be rapidly pushed ahead.

EMPIRE.—Ledge in south drift looks promising; also ledge in the stope. The west ledge in the stope is larger and better defined. No perceptible change in any other part of the mine.

IDAHO.—*Grass Valley Union*, March 3: Tomorrow this company declares their regular monthly dividend of \$7.50 per share, \$23,250, this being the 103d dividend declared. The mine looks as well as ever. An air compressor weighing 26,000 pounds will be put up on the mine this week. It will take the place of the compressor at present in use, and furnish power for the engine to be placed at the top of the new incline in the 1000-ft level, as well as what will be required for the machine drills in the drifts and stopes. There will be lively

work at quartz mining down Wolf creek in the next month or two, and from Gold Hill to Allison Ranch it will be a scene of busy labor.

PLACER.

IOWA HILL.—*Herald*, March 2: There is plenty of water in the ditches on that divide now, and the hydraulic mines in the district, to the number of 17, are running full heads. The ground is now thoroughly saturated, and all the snow that lies, or that may hereafter fall within the drain of this ditches, the miners will get the benefit of as it melts.

THE HAZARD MINE. at Bath, has struck the lead, and is taking out \$100 to the ton.

THE HIDDEN TREASURE. at Damascus, is employing a large number of men—the best evidence that could be given of the profitable working of the mine.

PLUMAS.

ABOUT GREENVILLE.—*National*, Feb. 23: The Gold Stripe mine makes its regular returns of bullion. Shipped this week one bar, of value \$7,000. The mine and works are in perfect order, and never looked as well before. One hundred stamps could be supplied with ore from the mine. A new 40-stamp mill will probably be built by the company in the early spring. We note a change in the management of the Wisconsin mining company, H. C. Bidwell having assumed control. The mine has been shut down temporarily, pending the retimbering of the main working tunnel, and an addition of five stamps to the milling capacity. The last clean-up exceeded the most sanguine expectations. The Plumas National mining company are running their new mill of 20 stamps constantly, on rich ore. The product for the month of February will exceed that of any heretofore. Their mill is one of the most complete in its mechanical construction ever built in the county. They have Hendy's self-feeders; also eight of Hendy's concentrators; two Hepburn pans and settlers, and a Fryberg barrel for the purpose of working the sulphurets, which assay from \$300 to \$500 per ton. The characteristics of this ore are the same as of the Plumas Eureka mine. The Green Mountain mine is yielding handsomely, and is in splendid condition. The late storms have interfered somewhat with the ditches supplying water to the mills, thereby causing some delay and stoppages to the mills. Both Round valley and Long valley reservoirs are filling up rapidly, and in a few weeks work will again be resumed at Providence hill.

SIERRA.

FOREST CITY.—*Mountain Messenger*, March 2: The American Hill H. M. Co. are at work with a full head of water. "Slug Canyon George" found a nugget which weighed nearly four ounces in his claim in Slug canyon last week. Miners are busy getting their ditches open. From all appearances water will start early this season. The outlook is better than it has been for many years. There is not an idle man from necessity at Scales' Diggings. Plenty of water, which means plenty of work. The Bald Mountain Co. recently found in their sluices a nugget of gold which weighed 69 ounces. They find one or more large pieces every season. The Brush Creek mine has been troubled with water, being about 80 feet deep. This is all surface water, and can be easily controlled when the projected tunnel is put in.

SINKING.—The Wilbourn M. Co. have run out of bedrock, and are now sinking a shaft to reach it again. They think they are over the rim rock and in the channel, which is lower than they thought.

BALD MOUNTAIN.—*Cor. Messenger*: The Bald Mountain Co., at Forest City, now employ over 200 men, and have 80 cars in use, more being added as fast as possible. They require 100, and will soon have them. The locomotive now takes the men about 1,000 feet further into the mine than formerly, the new turnout having recently been completed. It is not generally known how much is taken out daily, but the mine sustains its reputation, as the shipments speak for themselves.

The North Fork will soon be taking out pay dirt, after which the company will soon be rewarded for their heavy outlay.

At Morrinstown two monitors have been started, and more will be soon. The snow is nine feet deep, solid and full of water, insuring an excellent mining season.

SISKIYOU.

FORT JONES.—*Yreka Union*, Feb. 23: The claim owned by Quong Yen & Co., on Rattlesnake, is paying well. Also the adjoining company above, Ah Tune & Co., who lately purchased their claim of Mr. Titcomb, are getting a splendid prospect. Numerous prospecting parties from the Fort are out looking for claims, as this year water is sufficient to work in places where for years there has been none.

AT SAWYER'S BAR.—In addition to the Evening Star and Klamath, the Star of the West Co. are running their mill with a result fully up to their expectations.

TRINITY.

THE MCGILLIVRAY Co.—*Journal*, March 2: Is doing good work and making money, having realized \$4,400 in the last clean-up—the result of 20 days' run, seven or eight days being lost last month repairing damages by storm. Prospects in the mine are constantly improving.

ABOUT TRINITY CENTER. the storm has compelled the miners to quit work and repair ditches injured by floods and snowslides.

The mining outlook for Trinity was never better than at present, and we predict a yield of not less than \$1,500,000 and possibly \$2,000,000 from our gravel mines this season.

Nevada.

WASHOE DISTRICT.

CALIFORNIA.—Gold Hill News, March 6: Daily yield, 650 tons of ore. The mills are all running, and the bullion yield for February insures the payment of the regular monthly dividend of \$2 per share. During the week west crosscut No. 6, on the 1750-ft level, has developed a new body of very rich ore, proving a steady continuance of the rich ore to the northward on the lower levels. Sinking the C. & C. shaft was stopped yesterday morning by a sudden inburst of water on the 1500-ft level of the Con. Virginia mine, which was so strong that it was found necessary to divide it, carry a portion to the Gould & Curry and a portion to the C. & C. shaft, so as not to interfere with the working of the ore breasts in either the California or Con. Virginia mines.

CON. VIRGINIA.—On the 1700-ft level the south drift on the ore vein continues in rich ore as it is driven toward the Best & Belcher line. The winze in crosscut No. 2 east of the new ore discovery on the 1750-ft level is down 68 feet, and is expected to strike the ore vein inside of 15 or 20 feet more. A crosscut is being run through the new ore vein, 32 feet above the 1700-ft level, which is developing a fine body of very rich ore, being in fact much better than it was expected would be found at that point. The mills are all running, and the regular monthly dividend of \$2 per share will be made in a day or two.

OPHIR.—Both the east and west lateral south drifts on the 1900-ft level are being pushed ahead with all the speed possible. Both of these drifts are making much better speed than for some time past, on account of so much better air being furnished by the large 14-inch pipes recently put in. These drifts, where they reached the California line, were over 500 feet apart, but will be connected at that point by means of a cross drift in about six days more. When that and the joint Mexican winze connection is completed, this level will be sufficiently ventilated to permit of the commencement of the long expected crosscutting of this east ore vein, which will be begun at once. The joint east crosscut on the south line on the 1700-ft level is very nearly in to a point where it is this intention to start a winze downward to prospect the east ore vein between the 1700 and 1900-ft levels.

JUSTICE.—The yield of ore has been increased to 150 tons per day. The shipment of ore to the Santiago mill on the Carson river was commenced on Saturday last. There are now on band at the Pacific mill and in the dump about 1,200 tons of reserved ore. During the month of February, the Pacific mill crushed 1,980 tons of ore, which yielded \$50,164. The rich vein of ore struck last week 60 feet below the 800-ft level continues to the southward without change. Twenty feet below where this ore was found a drift has been extended in the rich vein of ore struck, showing that it has a steady downward as well as a southerly course. Both of the south drifts on the 1000 and 1150-ft levels have shown much improvement during the week. The north drift on the 1000-ft level has connected with the Lady Washington winze, which has greatly benefited the air in that portion of the mine.

YELLOW JACKET.—As soon as repairs are completed on the main winze, now down to the 2200-ft level, it will be carried down to the 2400-ft level. The new shaft is down 1,280 feet, bottom in dry rock of increasing hardness. A portion of the heavy machinery for the powerful pumping machinery arrived to-day from San Francisco, consisting of the shaft and hubs for the fly-wheels, weighing 50,600 pounds. More is expected to arrive to-morrow.

BELCHER.—The north incline or drain shaft is down 60 feet below the 2260-ft station. Prospects for finding a new ore body are better than for two years past. No work is being done on the 1900-ft level because of the great heat. The east drift on the 2160-ft level is in 200 feet, having penetrated over 60 feet of quartz of as fine a character as there is on the lode. In many places low assays, ranging from \$5 to \$15 per ton, can be obtained. The face of this drift is still in the same quartz formation, and the vein in every part shows a most decided improvement over both the 2060-ft and the 1900-ft levels. At the 2260-ft level the station is just completed, ready to start a drift east to cut the ore vein, and the improvement already shown on the 2160-ft level gives strong hope that at no very distant day the Belcher will resume her old place among the rich ore-producing mines of the Comstock.

GOULD & CURRY.—Timbering and enlarging the main incline making excellent progress. A flood of water bursting into the Consolidated Virginia mine on the 1500-ft level, necessitated the turning of a portion of it into the south drift on the Gould & Curry 1500-ft level, which interferes temporarily with the work below that point. As the flow of water undoubtedly comes from a pocket, it cannot last more than a day or two, when work in the main incline will be resumed.

SAVAGE.—The pumps have been kept running steadily during the week, holding the water without trouble some 50 feet below the 2000 level, while every effort was being put forth to complete a connection between the south drift on the 2000 level and the north drift from the Hale & Norcross. That connection was made yesterday morning, and a strong draft of air is now pouring through the drifts and up the main shaft. This will at once enable the lowering of the water again in the main incline. In the meantime the north drift

on the 2000 level, connecting with the Gould & Curry, will also be cleaned out and retimbered. Everything working finely.

MEXICAN.—The joint east crosscut on the north line of 1600 level is being steadily advanced, the face still in quartz affording low assays and bearing a very favorable look.

CROWN POINT.—Sinking the double working winze below the 2000 level is progressing at the rate of four to five feet per day, the bottom in very favorable ground.

SILVER HILL.—Sinking main incline going ahead, the bottom still in hard blasting ground. Also, main north and south drifts on 800 level. Flow of water easily handled by pumps.

HALE & NORCROSS.—A connection was made yesterday morning between the north drift on the 2000 level and the south from the Savage, which is now furnishing a strong draft of air down through the Hale & Norcross and up the Savages shaft. No attempt has been made to lower the water during the week, which has been held in easy subjection by the pumps at a point 45 to 50 feet below the 2000 level, but now that air has been obtained, the draining of the shaft will be resumed as soon as the 2000 drift is well timbered.

ALTA.—Sinking the main shaft, bottom still in vein matter of favorable description. The flow of water is quite strong, but is easily managed by the pumps.

BEST & BELCHER.—Sinking the joint winze below the 1700 level on the north line is making good progress. The north drift on the 1900 level has been advanced during the week at the rate of three feet per day. It is now in 200 feet north of the Gould & Curry north line. The southeast drift on the 1500 level is again being advanced.

CON. IMPERIAL.—Sinking the joint Alpha winze below the 2135 level on the north line is going vigorously forward, the bottom in good working ground. The north drift on the 2400 level is being pushed rapidly ahead, the face in quartz, clay and porphyry mixed, some of the quartz giving encouraging assays.

CHOLLAR-POTOSI.—The Chollar-Norcross-Savage shaft is making good progress. Flow of water 15,000 gallons per day. The reserve of ore crushed at the mills yielded during February, \$17,854.

SENATOR.—The Sutor Tunnel is driving its way directly through the Senator ground, and it is reported that good ore indications are already met with. Whether this is so or not, it certainly is not unlikely. The Senator company made definite arrangements, some months ago, to explore and work their mine from the tunnel level as soon as it should arrive at the most eligible point.

BULLION.—The main incline is timbered and in good working condition almost down to the 1840 level. The 1840 station will be completed in six or eight days more, ready for future use. An east cross-drift has been started out from the main north drift on the 2000 level, at a point about 150 feet north of the Bullion south line. The face of this drift is a lively character of vein matter.

OVERMAN.—Sinking main shaft advances rapidly. South winze below the 1400-ft level slowly advancing owing to strong flow of hot water. The east drift on the 1200-ft level continues in the same splendid quartz vein as at last report, having now penetrated it for a distance of 60 feet or more.

LADY WASHINGTON.—The south winze below the 850-ft level has been connected with the north drift on the 1000-ft level of the Justice mine, giving an excellent air circulation, and proving conclusively that both mines are working the same ore vein.

SUTRO TUNNEL.—Total length of tunnel last evening, 19,117 feet. The header is running in dry vein matter, and being now within the regular Comstock belt, no large or permanent bodies of water are likely to be met with, as the workings of the lode have already drained the water to a depth considerably below the level of the tunnel. It has nearly or quite 1,000 feet to run yet in order to reach the west wall of the great lode, but it is very liable to run into some of the old workings of the Savage mine before long.

BATTLE MOUNTAIN DISTRICT.

There has been shipped for the White & Shiloh company's new roasting furnaces, at Galena, two furnace cylinders, each 16 feet long by 7 feet in diameter, and weighing, respectively, 10,810 and 10,920 pounds. Also two boppers, each weighing 900 pounds. These cylinders and hoppers, with the articles thereto belonging, weigh 50,000 pounds. They will be double the capacity of those which have been in use, and it is expected will effect a great saving in fuel.

BUENA VISTA DISTRICT.

NATIONAL MINE.—*Silver State*, March 4: A company named the Truckee has been formed to work this mine, one of the first discovered and worked in Humboldt county, and from which ore was taken that yielded \$165 per ton. This company will complete the tunnel already well under way, and which will cut the lode at a depth of several hundred feet.

EUREKA DISTRICT.

PAYING UP.—*Sentinel*, March 2: The several local companies will pay out, during the week, over \$250,000.

CAVES are being met with in nearly every important mine in the district. The Richmond company has recently broken into two, both of which contain ore in large quantities. The Eureka Con. has opened the largest one on the lode, of immense proportions. The K K has

one on the third level, the Jackson two and the Connolly a medium sized one. Ore is always found in close proximity to these openings in the limestone, and many miners embrace the theory that they eventually fill up with vein matter, constituting the mold for ore bodies, and that the present deposits were filled-in in this way.

THE K K.—The *Sentinel* learns from an expert, who recently examined this mine for San Francisco parties, that it is in a splendid condition and evidences of wealth and permanency are to be seen throughout the various levels and drifts. On the 300-ft level a magnificent ore body has been encountered, near the cave or old workings, pieces from which assay as high as \$400 per ton. On the 400-ft level there is plenty of ore, and also in the 500-ft level, in the northwest drift, at which point a large deposit has been developed. The water is up to the sixth level, and cannot be handled by the present machinery, consequently shutting out everything below that point. There is no doubt but that the vein extends to and below the seventh level, and a drift was started some time ago for the purpose of tapping it, but was discontinued by reason of the strong flow of water interfering with the work to such an extent as to drive the miners from the drift. The K K Con. is one of the best mines on the lode, and will, in the near future, rank as a dividend paying one.

The Richmond company are shipping large quantities of lead. The freight-platform is daily burdened with an immense number of bars and rail transportation is taxed to the utmost.

The Fourth of July mine reports a promising ore strike in lower workings. Fourteen tons of ore were shipped from the Connolly mine, yesterday. The caved ground has been placed in good condition and the shipments will be large in the future.

TEM PAHUTE DISTRICT.

THE WATER QUESTION.—There being no water in the mines in this district, the principal company there is deliberating whether it will be best to sink an artesian well or bring water in from some springs about five miles distant, from which a plentiful supply can be obtained. The expense of pipe, if the latter alternative is adopted, will be considerable, but will be set off by the surety of a never-failing supply. They will determine this question soon, and proceed at once to obtain water when the matter is decided. There are good mines in Tem Pahute, but their development has been retarded by the difficulty alluded to. After a long respite work has been resumed there, and will be prosecuted with vigor.

Arizona.

SILVER KINO.—*Citizen*, Feb. 22: This mine shows no signs of petering. The amount of rich ore in the shaft and drifts seems simply fabulous. The Belcher and Crown Point mines, on the Wana Wheta belt, are yielding exceedingly rich ores, gray carbonates, sulphurets, oxide and horn blower.

RICH ORES.—Mr. Clark has 30 sacks of the Belcher ore sacked at the mine, ready for shipment to San Francisco. Three assays made from the poorest rock sacked went, the first, \$300; the second, over \$750, and the third over \$2,500 per ton, the average being \$1,032. Mr. Clark has with him about 75 pounds of this ore, in pieces that vary from an ounce to 25 pounds. This is to be sent on to San Francisco to-morrow, where there are parties negotiating for the sale of this property. He estimates that 100 tons of this very rich rock is now laid bare on top of the ledge, the walls having been worked away. An exceedingly rich ore strike has lately been made in the Pinal mountains, sample tests, according to the certificate of Assayer Degroot, going \$42,873.33 in gold and \$1,649.43 in silver.

MINING ITEMS.—*Enterprise*, Feb. 27: A fine body of ore has been struck on the Capitol lode, Turkey creek. The Peerless and the Pine Flat improve with development. The Goodwin tunnel goes ahead. The Tiptop company, who have several good mines in Humboldt district, are running their new 10-stamp mill successfully. From the Peck, Bradshaw, and various other districts in central Arizona, good accounts continue to be received. The Dividend mine, Humboldt district, owned by Judge Walsh and other Californians, is looking remarkably well. In the Swilling, at a depth of 85 feet, they have opened up richer ore than ever.

THE INCA AND AZTEC.—*Star*, Feb. 28: The new shaft on the Inca mine is down 40 feet; ore will yield \$100 to the ton. The new work on the Aztec shows a ledge of five feet in thickness; ore will reach \$200 to the ton. Good progress is being made on the Jefferson shaft; down 85 feet. Preparations are being made to smelt a few tons of this ore, which is a high per cent of lead, by mixing it with a higher grade ore, sulphate and chloride, from other mines belonging to the company, by repairing an old Mexican furnace on the company's property.

ORE SHIPMENTS.—*Sentinel*, March 2: Eighteen tons of Castle Dome lead ore, and over \$20,000 worth of Silver King concentrated ore, were shipped to San Francisco on Wednesday. Several large lots are now on the way here for shipment by rail. The new mill at Empire flat, in this county, is now a complete success. Its chief business is the concentration of copper ores, of which there are immense deposits close by. The object is to separate all waste rock from the rich ores, thus making a great saving of freight in transporting them to market. The ores are crushed by stamps and separated by currents of water. The mill is also provided with apparatus

for working gold-bearing quartz, of which there is a large mine within a few miles. A good wagon road has been made to it, and the quartz appears to be yielding a handsome profit. The gold is very fine, but no difficulty seems to be experienced in saving it.

Colorado.

VARIOUS CLAIMS.—*Miner*, March 2: The lessees of the Shively are doing well, ore continuing of the usual high grade. Johnson, Hoglund & Co. stopping above the Fletcher tunnel. The vein shows mineral whole length of their claim—100 feet—in some places on the foot-wall and in others on the hanging-wall. The streak is from one to two inches in width and consists of galena and decomposed sulphurets, the several classes of which run as follows: 1st, 617; 2d, 397; 3d, 237; and 4th class, 175 ounces. The lode rarely exceeds four feet in width, and, on the west end of this stoep, is intersected by a porphyry dike, 50 feet in width, which, however, does not reach the surface of the mountain. Aronson & Co.'s ground is improving. Vein from one to three inches in width. Last mill run yielded 922 ounces for first-class and 400 ounces for second-class ore. This is taken from a shaft, 60 feet deep. Broad & Co. are leasing east of this point, though scarcely with as much success as the parties mentioned above. The foot-wall carries half an inch of ore that mills 400 and 155 ounces, according to class.

Idaho.

SILVER CITY MINES.—*Avalanche*, March 2: Work is in progress on the Potosi, Black Jack and the Clearbrook with promising results, the same being true also of many claims in Boise Basin, where, also, a number of quartz mills are being run with profit. The outlook for the placer miners is everywhere considered good.

Montana.

BULLION.—*New Northwest*, Feb. 22: Walker Bros., Butte, shipped, this week, from the Alice mine, their 63d brick produced at these works. These bricks are in value from \$2,000 to \$2,500 each. During the week ending Monday, the 18th, there was shipped from Butte, by Wells, Fargo & Co.'s express, 1,643 pounds of fine bullion, valued at \$26,375.80. Mr. David Carson, Superintendent of the Hope company, Phillipsburg, came up Wednesday, bringing 840 pounds of silver; value, \$15,000, as part of the January run of the Hope mill.

COL. KEELER, of Helena, who has invested a fortune and eight years of labor in endeavoring to reach the great cross channel of Last Chance, was rewarded, last Saturday, by striking a bed of gravel west of the "Pot Hole." He had abandoned the tunnel and found this deposit in a shaft. The theory of the rich Pot Hole in Last Chance being caused by a cross channel is problematical; but if it is and is found outside Last Chance, Helena will again be the scene of extensive gravel working.

FOSSEL FUEL.—The Muscleshell valley is believed to be the most extensive coal field in the great northwest. Innumerable strata of the best quality of bituminous coal crop out in the coolies and washouts along the Muscleshell river and tributaries over a vast area of country, and when the area of railroads dawn upon Montana, this region will become the fuel-producing section of Territory.

New Mexico.

MINES LOOKING UP.—*Herald*, Feb. 9: Prospects on the McGregor are excellent, and the several companies working on different portions of this ledge are all doing well. Also those prospecting the Uncle Sam ledge. Mesere Hill, Long and Lucas, who are sinking on the Smith, Towers & Co.'s ground, have struck a body of ore which will pan out \$200 per ton. The Sullivan Bros. are working a lease on the Mallory & Bremen mine, and doing well. Stevens, Walters & Co. are taking out good ore, and the Silver Queen shows a superior body of ore.

LAS ANIMAS.—Grant County *Herald*, Feb. 16: There are about 100 men in these mines, mostly Americans. There are some 60 tons of ore now on the dump awaiting reduction. The arastras are working steadily, and take out an average of \$35 to the ton. Fresh's two-stamp mill will commence operations within a week. Judge Shaw of Socorro county is about to erect a five-stamp mill. The miners all feel confident and are preparing to build permanent homes.

GEORGETOWN.—Things here looking as usual. The camp is active and everybody in good spirits—mine owners and lessors generally doing well. A couple of quartz mills will soon be put up in the district. About 75,000 pounds of copper ore was lately sent from the Mesilla Valley, East via San Antonio, Texas.

Oregon.

AT JACKSONVILLE.—*Sentinel*, Feb. 27: Work progresses in the shaft of Smith, Courtney & Walsman in Rich gulch, with satisfactory results. The water is pumped out by the engine in their shop and work is continued day and night.

THE hydraulic claim of Gin Len on Little Applegate is still being worked. We presume it pays or Len would discontinue.

ONLY two and one-half miles of the Sterling ditch remains to be dug.

GALICE CREEK.—All the hydraulic claims on Galice creek are being run day and night. An immense slide of dirt and gravel did considerable damage in the English claim, carrying away quite a number of sluices and, of course, the product of several days' run. The claim of

Cook and Ankney shows a large quantity of the blue gravel peculiar to that section, and is evidently remunerating its owners handsomely. Bybee's claims show well and are no doubt yielding good returns.

Utah.

THE GRAND PRIZE.—*Salt Lake Tribune*, March 2: Shipments of bullion on February amount to \$176,000, turned out by two mills with a total of 30 stamps.

SILVER REEF ORE.—We received yesterday from Dr. A. K. Smith a specimen of ore from the Dixie mine, Silver Reef, assaying \$12,000 to the ton. The Doctor is just up from the sandstone region and says the camp is the liveliest little town in the mountains. The miners of Silver Reef predict an output of \$1,500,000 refined bullion this year.

BULLION MADE AND SHIPPED.—The last shipment of silver from the Old Telegraph leaching works, Bingham, weighed 4,147 ounces. The Union Express office received yesterday, from the Ontario mill, six bars of bullion, valued at \$9,192.82. The Godbe smelter at Frisco is turning out a car load of bullion daily; it is high grade and finds a ready market. One of our smelting men has 30 car loads of bullion in New York.

News in Brief.

THE Black Hills papers are beginning to agitate against the Chinese.

MINERS in the coal pits of England, are prohibited smoking under severe penalties.

THE low rates of coal have forced many of the large mine owners into bankruptcy.

THE Chinese will contest the validity of the cubic air ordinance.

MOST of the churches in this city continue the work of relieving the poor.

HEAVY snow storms in Utah and regions adjacent last month.

THE amount of fines and forfeitures paid into the Police court last month was \$5,595.

OFFICER COPPOLA, who was killed last week, left an estate worth about \$7,000.

THERE have been 1,000 polygamous marriages in Salt Lake city the past year.

ITALY, it is said, will not protect the Pope if he continues hostile to the government.

THE attempted division of Butte county through legislation is likely to fail.

FREDERICK W. MAX, accused of attempting to poison ex-Supervisor Drucker, is thought to be insane.

THE public debt statement for February shows a decrease in the debt for the month of \$2,250,037.

GUY R. SKINNER, aged 31, committed suicide in this city March 3d, by swallowing chloral hydrate.

WM. H. VANDERBILT has not, as was reported, agreed to settle with those contesting his father's will, paying them \$1,000,000.

THE rainfall in this city to date is 30.6 inches. To this time last year it was 9.87, and the year before, 26.10.

DAILY wages of carpenters on the bonanza mines have been reduced from \$5 to \$4, came as paid to underground miners.

BENJAMIN FRANKLIN WADE, ex-U. S. Senator from Ohio, died on the 22d inst. of typhoid fever.

THE elevated railroads in New York city, are nearly completed. Twenty locomotives of 14 tons each have been ordered for their use.

AFTER a lockout of eight weeks the English miners have yielded to a reduction of 12½% of wages.

A BILL to restore the death penalty for murder in the first degree, has passed the Senate of Wisconsin.

THE Gentiles of Utah protest strongly against the proposed law providing for their disfranchisement.

THE French Academy of Sciences has long offered a prize of \$20,000 to any one who may discover a cure for cholera.

THE Germans are well pleased with the appointment of Bayard Taylor as Minister to that country.

ARCHBISHOP WOOD pronounces the pretended restoration of a young woman to life by a Catholic priest, at Mauch Chunk, a delusion.

DESPITE the rains, the San Joaquin river is falling so rapidly that navigation on the upper waters is becoming very difficult.

BOSTON has doubled its police force within 10 years, and many citizens want it still further increased.

THE internal revenue receipts for February were \$300,000 less than for the same month last year.

DURING the first two months of the year our total treasure exports were \$3,070,021, against \$5,080,409 for the same time last year.

CONCERNING the effects of the Silver Bill, financiers entertain here, as elsewhere, a contrary view.

THE death, recently, at Rome, is reported of Ernest Livingston McCracken, stepson of Charles O'Connor.

THE Board of Manufactures of Fall River have voted unanimously to stop mills for two weeks in March and two weeks in April.

IN the breach of promise case of Dickey vs. Titus, at Hamilton, Ohio, the jury returned a verdict awarding the plaintiff \$6,000.

A LETTER, received from parties on Snake river, says the Ute Indians are acting in a very defiant manner. They have already killed 125 head of cattle, and threaten to go on the war path when the grass comes.

FREE lunches to the number of 1,831 were given to the poor on Saturday. Since the weather has improved the attendance at the free lunch tables has fallen off.

THE wages of stablemen in the employ of the North Beach and Mission Railroad Company have been reduced 16½%; that is, from \$60 to \$50.

REFUGIO PEREZ, a native of Mexico, 26 years of age, has been sent to the Nepa Insane Asylum. Cause, grief for the death of her husband.

JOHN T. ARNOLD, city marshal of Colnse, was shot and killed on the 4th inst. by Dudley Shephardson, formerly District Attorney of Colusa county.

VINCENT WESTLEY, his wife, two daughters, a nephew and Wm. Taylor were killed near Rich Hill, Kentucky, a few days since by a tornado.

It is contended by a writer in the *Chronicle* that the Moreau dredging machine will construct cheaper and better levees than can be done by Chinese labor.

SALLY BARNES shot her husband, Wesley Barnes, through the cheek a few days since, because, as she says, he had, after squandering all her property, abused and abandoned her.

JOHN RUNK, the young man who killed police officer Coots, has been sentenced to be hung on the 29th of this month. Only the Governor's pardon can now save him.

THE wife of Wm. Flynn, car driver, gave birth to triplets last week, all girls, living and so much alike that it is difficult to distinguish them.

RESIDENTS of the Black hills have numerously petitioned Congress in favor of erecting that portion of Dakota into a new Territory, to be called Lincoln.

It is reported in London to do away with steam fire engines hereafter, and depend entirely on high pressure hydrants for water for fire purposes.

IN Colusa county, Dr. Glenn lost 20,000 sheep by the flood, and 6,000 acres of wheat. John Boggs lost 2,000 sheep out of 15,000 and 600 acres of wheat.

THE city police made 1,425 arrests during February. Four hundred and fifty-two charged with drunkenness; 163, violation of the cubic air ordinance.

THE United States Treasurer hopes to pay salaries of members in silver next month. They will each receive about 25 pounds of silver if he does.

CHARLES C. NAHL, the painter, died in this city last week. He was a native of Germany, came here in '50, and was an artist of great merit.

THERE is no foundation for the rumor of a big suit to be commenced by the wife of ex-Senator Gwin to recover a large portion of the city of Oakland.

IN Madison county, Florida, is a family in which the father is 7 feet 4, the mother 6 feet 8; two sons 7 feet 3, and one daughter is 7 feet 9 inches high.

A NORTH CAROLINA paper prints what it calls "a matrimonial guide," in which the names of "the belles" of the various Southern States are used with uncommon freedom.

THE illicit distillers sell whisky to the Indians at Sitka. Under its influence the savages have become so dangerous that the whites are threatening to leave the country.

DURING February the city Coroner investigated 25 cases—1 of accidental death, 2 of manslaughter, 13 of suicide, 6 from natural causes, and 3 stillborn.

PARTIES representing various industries in Pennsylvania strongly oppose the conveying of crude oil from the oil regions to Baltimore in pipes, as it would work great injury to these industries.

SINCE July 1st, San Francisco has exported 82 cargoes of wheat, embracing 3,131,000 centals, valued at \$7,257,000. During the corresponding period in the previous season we exported 277 cargoes of wheat and flour.

MR. LOWTHIAN, the English expert, says the age of iron being passed, we have now reached the age of steel. Mr. Lowthian is probably correct, only he has not spelled the word quite right.

THE new King of Italy has put his sign manual to the virtual abolition of capital punishment. His first official exercise of sovereign authority was to sign the commutation of 85 death sentences.

J. C. CORNBELL, keeper of a shooting gallery in Sacramento, shot himself through the head dangerously, while attempting to illustrate how a man tried to commit suicide in his place a few nights before.

THE cost per mile of building railroads is, in England, \$195,060; Prussia, \$105,115; United States, \$53,558. In operating them the ratio of cost is reversed, being in England, \$53.90; Prussia, \$58.45; United States, \$62.50.

THE *Monitor*, Catholic organ in San Francisco, infers from the number of interments made in the cemeteries of that denomination, that they number 120,000 of the 276,000 white population in the city.

A CARBOY of nitric acid exploded yesterday in a freight car at the Union Pacific freight-house at Omaha, and John Welch, an employee, was fatally injured by inhaling the fumes. The car had in it 10 carboys of nitric acid for the San Francisco Mint.

MICHAEL McANDREWS has been hung at Radareburg, Montana, for the murder of a man named Mayer, last fall, with whom he had traveled from the Black hills. The evidence was circumstantial. He made no confession.

THE ENGINEER.

Chain Towing on the Elbe.

The *Polytechnic Review* translates, from a French exchange, an account of chain towing, which is employed throughout the navigable portion of the Elbe, from Aussig, in Bohemia, to Hamburg. The ordinary steam-tugs being unable to compete with the railway, and the towage on the Seine and other French rivers having yielded such good results, M. Nobiling made a special examination of the systems already at work. He found on the Seine a towing system, having a 50-horse power engine hauling a dozen barges, carrying a total load of 3,000 tons, at a velocity of 3,200 meters (two miles) per hour against a current having a velocity of 400 meters (about two and a half miles per hour). The system furthermore presents the advantage of producing no waves, an advantage that extends to the maintenance of landings, bath-rooms, rafts, etc. The Navigation Company of Hamburg-Magdeburg, having obtained a concession for 30 years, selected for their preliminary experiments a portion of the river between Buckau and Neustadt, about 4,800 meters in length, and where the steam-tugs worked with difficulty when the river was high. The chain was established between these two cities, and a flat-bottomed tow-boat, constructed in the workshop of the company, began a regular service in August, 1866. It was attended with complete success. The chain was then extended to Ferchland, 48 kilometers below Magdeburg, at a cost of 254,625 francs for the chain and 264,375 francs for three tow-boats, a total of 519,000 francs (\$103,800). This proved so remunerative that the company decided to extend their work to Hamburg, in order to secure the traffic, which amounts annually to 300,000 tons. The remaining 158 kilometers were completed in 1874, at a cost of 3,250,000 francs (\$650,000), including a set of 10 rows in service. From 1869 to 1871, 320 kilometers of chain had been established in the Elbe, not including 22.4 kilometers in the Saale, one of the branches of the Elbe. The total length now of chain in this system is 672 kilometers (418 miles) and the number of tows is 25.

IMPROVEMENT OF THE LOCOMOTIVE.—The ordinary American engine, remarks the *Iron Age*, from which we quote, consists of four driving wheels, upon which two-thirds of the weight is placed, with a pilot or truck in front to guide the machine, while in the rear a separate carriage, usually upon eight wheels, carries the fuel and water. To make the pilot or truck follow the line and do its work in directing the engine, it is necessary to throw upon it about one-third of the weight. As the power of the engine to haul loads is measured by the weight which can be placed upon the driving wheels, it will be seen that the load upon the truck is of no value whatever in increasing the power of the engine. The tender, while requiring much power to haul it, contributed in no way toward the useful effect of the power. Mr. Forney, in designing a locomotive for the Bellerica and Bedford railway, entirely changes the arrangement of the engine. The truck beneath the smoke-box is removed and the whole weight of the engine and boiler thrown upon the drivers, which are both placed beneath the barrel of the boiler. The frame is then prolonged beyond the foot-plate, so as to make room for the tank and coal which are placed upon it. Under this end of the engine is placed the truck. The engine then runs tank forward and smoke stack at the rear. With this arrangement the whole weight of the engine is made available upon the drivers for producing adhesion, while the variable weight of fuel and water, which in the ordinary style produces no useful effect, is utilized as load for the pilot. As a carriage the engine has been improved, while the advantages in construction are very great. Ample room is obtained for the fire-box, the engine is vastly lighter for the same tractive power, the engineer has a better opportunity to see the track, the cab can be entirely closed on all sides, and last, the spark annoyance is greatly lessened because the smoke-stack is so near the forward car as to throw the sparks upon its top instead of against the end. This latter point, important as it is, was not brought out until the engine was put to work.

EADS AND THE MISSISSIPPI.—Capt. J. B. Eads delivered an interesting lecture at St. Louis recently, in which he brought out some of the singularities of the "father of waters." He said that at the head of the Passes, a distance of 12 miles from the Gulf of Mexico, the flood level of the river was 12 feet above the gulf's ocean level; at New Orleans, about 16 feet; at Red river, 50 feet; at Natchez, 66 feet; at Gaines' Landing, 149 feet; at Memphis, 221 feet; at Cairo, 322 feet; and at St. Louis, 412 feet above the gulf's level. The grade of this slope, however, differed very much in different sections of the river. From New Orleans to the Passes the slope was not more than an inch and a half to the mile, while from Memphis to Cairo it exceeded five inches, and from Cairo to St. Louis it exceeded six inches per mile. What is more wonderful still is the fact that there is no notable difference in the velocity of the river from St. Louis to the gulf, the reason, according to Capt. Eads, being that the river ran through a bed of its own making, and, passing through an alluvial district, would not tolerate

a current that was too rapid for its needs. All plans for improving the river, he maintained, must be confined to deepening the channels over the bars, and this would render any further increase of the levees unnecessary.

Government Atlas of Colorado.

The atlas of Colorado, soon to be issued by the U. S. Geological Survey of the Territories, under Prof. F. V. Hayden, embodies the results of the geological and geographical work of the survey during the years from 1873 to 1876, inclusive. This atlas will contain the following maps:

1st. A general drainage map of Colorado on a scale of 12 miles to the inch. 2d. An economic map of the same region, having as its basis the above mentioned drainage map. This map will indicate the areas of arable, pasture, timber, coal, and desert land in as great detail as possible on the scale. 3d. A general geological map on which the areas covered by the principal formations will be shown. The drainage map will form the basis for this also. 4th. A map showing the scheme of the primary triangulation in the State. Scale, 12 miles to the inch. 5th. Six topographical sheets, showing the same area as that covered by the general drainage map, but in much more detail. The scale of these sheets is four miles to an inch. The relief of the country is indicated by contour lines, at vertical intervals of 200 feet. The area covered by each of these sheets is, 11,500 square miles. 6th. Six geographical sheets, of which the bases are the six topographical sheets just mentioned. On these the detailed geology is expressed by colors.

With the appearance of this map, Colorado will be better known, topographically and geologically, than any other State in the Union.

RUNNING A LOCOMOTIVE ON THE HIGHWAY.—The *Farwell Michigan Register* says: Perhaps the most novel sight in this line ever seen in Michigan was witnessed here to-day in the way of a railroad engine steamed up, running through the wood on a common dirt road. This engine arrived a day or two since on the Flint & Pere Marquette railway from Pittsburgh, made expressly for their railroad north of this place, used for hauling logs to the Muskegon river. After its arrival here the query was how to get the engine to its destination, some 15 miles distant. Two hundred dollars having been offered for the job without avail, the managers conceived the novel plan of getting up steam and trying the wagon road, which was put into execution. This morning steam was gotten up and the engine started northward on the Ionia & Houghton Lake state road at the west end of town, with cheers and hurrahs from the assembled crowd. It moved off slowly and steadily without any apparent difficulty, followed by a force of men with levers, and teams with water to supply its wants. The sight was curious and novel—a railroad engine puffing through the tall pines, vomiting fire and smoke and starting the astonished woodsman along the route. An astonished mossback came into town the same day and declared that he had seen hell and the devil "back here in the woods." The story of the steamboat looking for water may not be hard to believe after this.

MINE LOCOMOTIVES IN GREAT BRITAIN.—The *Railway Age* remarks that railways for mining and manufacturing purposes, of very narrow gauge are becoming quite common in Great Britain. Several miniature locomotives have been constructed for a road of 19 inches gauge in the lead mines of the Great Laxey mining company. They are but two feet three inches in width and a little over four feet from the rails to the top of the chimney; the cylinders are placed inside and are four inches in diameter, and six-inch stroke. The wheels are ten inches in diameter, of cast steel, and the engine is carried on two wrought-iron frames extending the whole length. It is fitted with link motion, feed-pump, injector, break gear, etc. The water is carried in a tank between the frame plates. Each of these little machines will draw on a level from 13 to 15 tons at a speed of about eight miles per hour.

OIL PIPE IN NEW YORK.—A general pipeline bill has been introduced in the New York Legislature, somewhat similar in its provisions to the one recently defeated in the Pennsylvania Legislature, that is, it provides for the organization under a general law of corporations to construct pipe lines for the conveyance of petroleum anywhere in the State, precisely as railroad companies may be organized in New York and most of the other States under general laws, without special charters.

COPPEROPOLIS ITEMS.—The Pine Log claim, situated about three miles from Copperopolis, and owned by Bouches & Co., is looking well. The products of 18½ days crushing with a five-stamp mill amounted to 90 ounces. We learn that it is the intention of the owners to erect five additional stamps as soon as the weather will permit. The Eagle copper mine ships from 20 to 30 tons of ore every week. The company are erecting new smelting works in San Francisco capable of smelting 200 tons per week. As soon as they are finished ore will be shipped in large quantities. It assays from 20% to 30% of gold and the same per cent. of copper. We learn that a San Francisco company have leased the McNeely copper claim, on Hog Hill near Lane's Spring, and will put a force of 100 men to work when spring opens. —*Calaveras Citizen*.

The Valleys of the Sierra Nevada.

The magnificent valleys of the Upper Sierra have as yet attracted but little attention. Hitherto they have been used mainly for grazing purposes. But it is safe to say that California possesses an empire of arable land in these valleys, second in importance to no other part of the State. We venture the assertion, with entire confidence in its accuracy, that the arable acreage of these mountain valleys is equal to the arable acreage of the Sacramento valley. A general idea of their great extent may be obtained by estimating the vast acreage of the Sierra, Mohawk, American, Indian and Honey valleys. Besides, there is another class of smaller valleys, which may be estimated as reaching the number of 10,000. The foothills of these valleys can be cultivated, and the area of these foothills have the same relative proportion to their valleys as the foothills of the western slope have to the Sacramento valley. The average elevation of these valleys is about 3,000 feet, and they are so protected by the surrounding ridges and forests that the disadvantages of elevation are immensely decreased. The snowfall is great, but the temperature is in all of them less severe than in the States of Ohio and Kentucky. The abundance of wood and stone as material for fuel and building removes many of the difficulties which adhere to the colder climates. The healthfulness of these valleys surpasses that of the foothills. While malarious diseases exist to some little extent, the troubles incident to weak lungs are not felt at all. And we may safely say that in the future the brain and the muscle of the State will be mainly replenished from the population of these higher valleys. The productiveness of these valleys is no longer a matter of doubt; they produce everything that man needs. And as all the surrounding mountains may be made to produce abundant pasturage, the agriculturists of those regions will be able to combine all the departments of their calling. The great valleys already named are settled by a hardy race of intelligent people, who have demonstrated the fact that those regions possess all the qualities that can be desired. They now produce hogs, grain and most of the vegetables.

The soil of this region is a rich vegetable mold, and generally very deep. The supply of water is abundant and irrigation is not a necessity. These valleys never suffer from drouth. At the present time a market is found for all surplus production in adjacent mining regions. But as the population increases, narrow-gauge roads will provide an exit to the markets of the world. Until that time arrives, the present market, with grazing, will furnish abundant scope for the enterprise of the people. The attractive scenery, the productiveness, and the healthfulness of these high valleys, will always make them desirable places of residence. The appliances of civilization can be found in every one of these valleys, and their present state of development is prophetic of grand advancement in the immediate future. —*Record-Union*.

GYPSUM DEPOSITS IN LOS ANGELES COUNTY.

—Since it has been learned through Prof. Hilgard of the State University that gypsum will neutralize alkali in the soil, that article promises to assume a degree of importance not hitherto expected. In reply to an inquiry as to where it could be obtained, the Professor in one of his lectures said to his hearers: "Seek, and ye shall find." Its practical value in the reclamation of land depends upon the cheapness with which it can be obtained, and consequently the question was a very pertinent one. A deposit of gypsum has been discovered in Los Angeles county, but with this exception we have not, until recently, heard of any in southern California, where it is principally needed. We are informed that deposits of gypsum extended along the foothills from Caliente to Long Tom, a distance of perhaps 30 miles. As it has not been prospected as yet, the extent of these deposits is not known, but it is believed there is an abundance. The deposits near Caliente are convenient to the railroad, and can therefore be delivered for shipment without great cost. The probability is that the problem of how to obtain gypsum cheaply is to be solved here in Kern county. As we have much land that would be valuable but for the presence of alkali in large quantities, the discovery promises to be of decided importance to our own local prosperity, and it may turn out that the worthless alkali flats will, in a few years, be as valuable as our best lands. —*Kern County Gazette*.

A HUGE COOPERAGE.—The Standard Oil Company is constructing at Pittsburg a factory for making barrels for its own use. The building will be 300 feet square, and supplied with the latest improved machinery, with a capacity for turning out 5,000 to 10,000 barrels a day. The establishment will cost about \$50,000. In connection with this, there is being erected a large agitator, to be used in completing the process of refining oil, and to which the oil will be conducted from the refineries in the neighborhood by means of pipe lines, and afterwards barreled.

MARK THIS.—Let it be remembered by workmen who contemplate engaging in a strike, that for every week so lost a certain number of weeks' work at the higher wages struck for, is required in order to avoid positive loss to the workmen. Thus in the case of a strike of six months' duration for an advance of 10 per cent. in wages, five years' labor at the higher rate will be required in order to make up the positive loss incurred in the strike.

Mine Ventilation.

Mine Inspector William Wilcox, of the bituminous coal mines of Pennsylvania, has issued a circular calling the attention of operators and mine superintendents to a number of important provisions of the ventilation law of that State. The following extract will convey some idea as to the character of these provisions, some of which it might be well perhaps to incorporate into the laws of California, Nevada and other mining countries on the Pacific coast.

Section four requires that you shall provide ample means of ventilation, affording 100 cubic feet of air per minute for each and every person employed in said mine, which shall be circulated around the main headings and cross headings; and section five of said law requires that it shall be the duty of the mining bosses to measure the air current at least once a week at the inlet and outlet, and at or near the face of the headings, and keep a record of such measurements and report the same to the Inspector of his district, once each month; that it shall be the duty of the mining boss to see that sufficient timber is furnished of suitable lengths and sizes for the places where they are to be used and placed in the working places of the miners. It is imperative that the superintendent or mining boss have some means of measuring the air current and a good anemometer is the instrument for that purpose. Any person desiring information as to the mode of taking air measurements in the mines will be cheerfully informed upon application. In order to afford 100 cubic feet of air per minute for each and every person employed in the mines, it is very essential that the mine be ventilated otherwise than by natural ventilation, as all experience teaches that natural ventilation is not reliable for the mines in this district for any length of time, even under the most favorable circumstances. Therefore every mine should have a ventilating furnace, or fan and shaft, the deeper the shaft the better for furnace ventilation. It is frivolous for mine owners to attribute the foul air in the mine to the weather outside. A good supply of fresh air can be secured and circulated around the face of the workings, regardless of weather outside.

A Nearly Analogous Case.

The suit of Sanderson and wife vs. the Pennsylvania Coal Co., was on trial last week. The suit was brought to recover damages from defendants for pumping water into a stream that runs through the plaintiff's property, rendering it unfit for use. There was no dispute concerning the facts in the case, which were, substantially, that the defendants, by discharging mine water into the stream, had rendered it unfit for domestic use. It appeared that defendant's colliery and works were situated within the watershed drained by this stream, and in the natural and reasonable use of their property the mine water passed into the stream. The legal question involved in the case was as to whether the defendants were liable for this kind of injury. Upon a motion for a *nonsuit*, Judge Stanton granted it, holding that inasmuch as the defendants did not create the impurities in the water, but encountered them percolating through the mine, and allowed them to flow into the brook by gravity, they were not liable in damages. The case will go to the Supreme Court, and we will then have a final adjudication upon this question, which is of vast importance to both property owners and those working mine. It is singular that this question has never been taken to court, for it is a state of affairs which must have arisen many times in the history of mining in this county. —*Wilkes-Barre Record*.

While the above is not exactly a parallel case to that of the farmers and miners in California, it still raises questions and involves legal principles so analogous to those likely to be passed upon in the mining debris suits, that any decision made therein may be supposed to have an important bearing on the latter.

CHARCOAL BURNING IN NEVADA.—There are 800 coal burners employed in the Eureka trade, 90% of whom are foreigners, and about 50% of the latter are American citizens. With a few exceptions this force is in the employ of less than a dozen firms, two-thirds of whom are of foreign birth. The average distance that the coal is hauled by teams is 35 miles, 10 companies owning the outfits. There has been consumed within the last five years 6,000,000 bushels of charcoal, and it is estimated that there is timber enough standing within a radius of 60 miles to produce 25,000,000 bushels. The regulation standard allows 33 bushels of coal to one cord of nut-pine wood, but this is not correct, actual experience proving that it will not produce more than 28. It will be seen that there is not quite a million cords of wood in the growth of timber on the hills and mountains, and probably one-third of this is not available. At the present rate of consumption our supply will be exhausted in eight years, allowing that every stick of growing timber can be utilized. At the price ruling in Eureka (25 cents per bushel), the article remaining to be marketed in the future has a value of \$6,000,000. If the mines of Eureka district remain permanent, and do not give a larger output of ore than at present, we shall be forced to look to the dense timber growths of the Sierra Nevada for our future supply. —*Eureka (Nev.) Sentinel*.

Falling Mountains.

We had an account not long since of a mountain in the Savoy, Switzerland, which from some inexplicable cause suddenly commenced tumbling down and for 20 days went on steadily disintegrating itself until much of it had rolled into the valley below, causing the destruction of two flourishing villages. While this work of dismemberment was in process it caused a terrific sound and filled the air with clouds of dust. Immense rocks descended the mountain side, a distance of a mile, in 30 seconds, and bounding sometimes 1,500 feet, crushed the great pine forests like thistles. And now there comes from Montana, the story of another falling mountain. In the northern part of that Territory, distant from Helena 30 miles, rises a singular elevation conspicuous for many miles around, called Bear Tooth mountain. It consists, or rather did consist, of two tusk-like peaks, hence the name, standing on the summit of the range, above which, dark and grim, they lifted themselves to the height of many hundred feet. A short time since a party hunting in the vicinity heard a heavy sound that so shook the earth that they supposed it to be an earthquake. On reaching the Bear's Tooth a little after, they found the eastern tusk had disappeared. This was a perpendicular mass of rock and earth, fully 500 feet high, 300 feet in circumference at its base and about 150 feet at the top. This immense mass had become dislodged, and coming down with the speed of an avalanche had swept through a forest of large timber for a quarter of a mile, entirely leveling it. The country around is now covered with a great mass of broken trees and tons upon tons of rocks, many of them as large as an ordinary house.

Mining Phrases.

A drift is an opening from the shaft, six to eight feet in height, and four to six feet in width, and is made of any length, just as circumstances require.

A cross-cut is the same kind of opening, and generally runs cross-course from a drift.

A winze is a small shaft sunk from one drift to another.

An upraise differs only from a winze in that the digging is upward instead of downward.

Porphyry is barren rock found intermixed with ore, sometimes in large, but more frequently in small quantities, and also forms a portion of the encasement of a ledge.

An ore-breast is the ore exposed by drift or cross-cuts, and "breasting out" is the extraction.

Ore etopes are the same as ore breasts, with this exception, that the former means the ore overhead, the latter in front or on the sides.

A lateral drift is a side drift or cross-cut.

A shaft is "up cast" when the current of the air is upward instead of downward in not sucking the air from the surface. The Ophir shaft has lately experienced a change from a "down cast" to an "up cast."

PROGRESS OF THE METRIC SYSTEM.—At a late meeting of the American Metrological Society Prof. J. E. Hilgard stated that the United States had not yet been formally constituted a member of the International Bureau of Weights and Measures. The preliminary steps had been taken towards this end, and the matter now rested at the disposal of the Senate Committee on Foreign Relations. The French Commission is busy in preparing the new standards of weight and measure, a work requiring great accuracy to obtain uniform results. The manipulations are of extreme delicacy. Special apparatus and tools have to be invented and made, and months elapse in their construction. These difficulties will be eventually overcome, and the progress already made is a guarantee that standards of uniformity and accuracy will be made for distribution among the nations which take part in the convention. In regard to metric standards for the United States, Prof. Hilgard said that the standards for separate States had been tendered to each, and were very generally accepted. About 30 States have received their standards and placed them on exhibition in public places, where they will be accessible for reference. These standards consist of two meters, a kilogramme, a half kilogramme, a liter and a half liter.

COLLAPSE OF A COAL MINE.—The Dennison mine, near Akron, Ohio, being about to cave in the other day, the men were all removed before the crash came. The area caved in was about six acres, leaving a surface depression six or eight feet deep. So violent was the concussion of air caused by the sudden downfall of this vast weight that a huge column of air was blown out into the adjoining parts of the mine, extinguishing lights and causing some consternation among the men.

"NO LIKEE."—Chinese conservatism and bigotry succeeded in suppressing that dangerous innovation, the railway, almost as soon as it obtained a hold upon the sacred soil. At last accounts the track was being torn up and the four little engines in use there were being taken in pieces, preparatory to being sent to the island of Formosa, where, cut off by the sea from the possibility of extending through the ancient kingdom, they may possibly be allowed to do a limited work for civilization.

USEFUL INFORMATION.

The "Queen's Pipe."

The following is an extract from Mr. P. L. Simmonds' work on "Waste Products and Underdeveloped Substances." "In the very center of the large tobacco warehouses in the London docks there is a great kiln, familiarly known as the 'Queen's Tobacco Pipe,' which consumes as 'waste' an enormous quantity of articles. The fire of this furnace never goes out, day or night, from year to year. There is an attendant who supplies it with its fuel as it can take it, and men, during the daytime, are constantly coming laden with great loads of tobacco, cigars, and other valuable merchandise condemned to the flames. Whatever is forfeited, and is too bad for sale, be it whatever it may be, is doomed to the kiln. At the other docks damaged goods are buried till they are partly rotten, and then taken up and disposed of as rubbish or manure. Here the 'Queen's Pipe,' sucks all up, except the greater quantity of the tea, which, having once set the chimney of the kiln on fire, is now rarely burnt. And strange are the things that sometimes come to this perpetually burning furnace. On one occasion the attendant informed us he found 900 Australian mutton hams. These were warehoused before the duty came off. The owners suffered them to remain till the duty ceased, in hopes of their being exempt from it; but this not being allowed, they were left till so damaged as to be unsalable. Yet a good many, the man declared, were excellent, and he often made a capital addition to his breakfast from the roast that for some time was so odoriferously going on. On another occasion he burnt 13,000 pairs of condemned French gloves. In one department of the place often lie many tons of the ashes from the furnace, which are sold by auction by the ton to gardeners and farmers as manure, and for killing insects, or to soap-boilers and chemical manufacturers. In a corner are generally piled cart-loads of nails and other pieces of iron which have been swept up from the floors or have remained in the broken pieces of casks and boxes which go to the kiln.

Various Woods.

The following are interesting items concerning the commercial value and properties of the better known woods, as laid down by the *American Builder*:

Elasticity.—Ash, hickory, hazel, lancewood, chestnut (small), yew, snakewood.

Elasticity and Toughness.—Oak, beech, elm, lignum-vite, walnut, hornbeam.

Even grain (for Carving or Engraving).—Pear, pine, box, lime tree.

Durability (in Dry Works).—Cedar, oak, yellow pine, chestnut.

Building (Ship-Building).—Cedar, pine (deal), fir, larch, elm, oak, locust, teak. Wet construction (as piles, foundations, flumes, etc.).—Elm, alder, beech, oak, whitewood, chestnut, ash, spruce, sycamore.

Machinery and Millwork (Frames).—Ash, beech, birch, pine, elm, oak. Rollers, etc.—Box, lignum-vite, mahogany. Teeth of wheels.—Crah tree, hornbeam, locust. Foundry patterns.—Alder, pine, mahogany.

Furniture (Common).—Beech, birch, cedar, cherry, pine, whitewood. Best furniture.—Amboyna, black ebony, mahogany, cherry, maple, walnut, oak, rosewood, satinwood, sandalwood, chestnut, cedar, tulip wood, zebra wood, ebony.

Of these varieties, those that chiefly enter into commerce in this country are oak, hickory, ash, elm, cedar, black walnut, maple, cherry, butternut, etc.

RED DYE FOR IVORY, BONE, ETC.—The following is given in the *Druggists' Circular*: Take one drachm of picric acid and dissolve it in half a pint of water; when cold, add two drachms of water of ammonia. Dissolve also half a drachm of magenta in one and a half ounces of alcohol, dilute with three-fourths of a pint of hot water, and add two ounces of ammonia. As soon as the red color of the magenta solution has disappeared, the two solutions are mixed together, making a hulk of liquid amounting to one and a quarter pints. Ivory and bone should be placed in very weak nitric or hydrochloric acid first, before being immersed in the ammoniacal liquid. If to the ammoniacal liquid some gelatine solution is added, it may serve as a red ink, which does not attack steel pens. By varying the proportions of the magenta and picric acid, the tints obtained may be varied from a bluish red to a bright orange red. The desired colors do not appear till the ammonia has evaporated.

IMITATION EBONY.—Ebonyized wood is much in demand nowadays for painted panels and other decorative purposes. In some respects it is preferable to the genuine ebony. Apple, pear and walnut wood, especially if fine-grained, may be "ebonyized" by the following process: Boil in a glazed vessel, with water, four ounces of gall-nuts, one ounce of logwood chips, half an ounce of vitriol and half an ounce of crystallized verdigris; filter while warm, and brush the wood with the hot solution a number of times. The wood, thus stained black, is then to be coated two or three times (being allowed to dry completely after each coating) with a solution of one ounce of iron filings in a quart of good wine vinegar. This is to be prepared hot, and allowed to cool before use.

TASTE IN JEWELRY.—Taste, if slowly, is really improving, says the *British Trade Journal*. The gaudy mixtures of colored gems in jewelry are now no longer tolerated. The one-color theory is being more generally recognized; the theory that a jewel should have but one prevailing color, and that the dress on which it is worn should harmonize with it. Then the forms of articles in jewelry are less florid; they are simple, and generally have a geometric basis. The delicate wire decoration, now often adopted, is on a good classic plan, and the spaces well arranged. Lastly, and perhaps best of all, we are no longer getting all our best designs from Paris. English jewelers are beginning to have ideas of their own, and are no longer content to follow the lead of the modern Athenians. It has been much remarked lately by visitors to France that British styles of jewelry are beginning to prevail there, in place of the peculiar Parisian style which has so long held sway. All these things are healthy signs; and if the Birmingham jeweler is only true to himself and to his calling, if he resolutely sets his face against mere cheapness and sham, if he regards his manufacture as an art and not as mere commercial speculation, if he insists on excellence in finish and style, he need not fear to lose his position amid all the foreign competition that can assail him; but he will find his wares annually more esteemed in the markets of the world.

NEW USE OF SOUR MILK.—A new industry has been started in Mansfield, Mass. It is no less than the manufacture of jewelry out of sour milk. This seems a strange anomaly, but it is a fact. The milk comes in the shape of curd from butter and cheese-making counties in New York, and looks, upon its arrival, a good deal like pepped corn; but, before it leaves the shop, it undergoes a wonderful change and receives the name of African coral. The secret in making it up is carefully guarded, but it is certain that it is to be heated very hot, during which coloring matter is introduced, followed by a very heavy pressure. Some of it is colored black and called jet, while some appears as celluloid. It makes very handsome jewelry, and is made into all kinds and styles known in the trade.

RESOURCES OF AFRICA.—The capabilities of Central Africa as a source of food supply are believed to be great, and it is certain that the country yields rice of good quality. Samples grown about 100 miles south of the Zambezi river, and 200 miles from the coast, have been exhibited at the Chamber of Commerce, Port Elizabeth, packed in curious bags made from the fibrous bark of a tree. The rice, it is stated, may be bought from the natives at about 4s. per 100 lbs., separated from the husk, and cleaned and fit for use.

FLANNEL SHRINKING.—To prevent the shrinkage of flannel a French manufacturer has found high-pressure steam of great value. He folds the flannel loosely, and then places it in a box containing a perforated bottom through which super-heated steam is admitted; the latter enters the fabric with a certain force which fixes the fiber of the wool in such a manner that fulling, as well as washing, causes no shrinkage.

GOOD HEALTH.

My Liver.

What makes this world so drear and sad?
Why am I never, never glad?
What is it drives me nearly mad?
My liver!

Why do I moan, and sob, and sigh,
And wish, ay! wish that I might die?
Why would I pass from earth, oh, why?
My liver!

What is it on my heart doth seize;
Then come in form of cough and wheeze?
Then makes me think I've Bright's disease?
My liver!

Whence is this spinning in my head?
Why are my pulses almost dead?
Why doth my stomach feel like lead?
My liver!

What makes me sausages eschew,
And buckwheat cakes and mince pies, too,
And everything that's feed?
My liver!

What is it, day and night intent
On every sort of devilment,
Doth all the ills to me present?
My liver!
—*Phrenological Journal*.

The Effects of Cigarette Smoking.

Several of the prominent physicians of New York city unite in declaring that cigarette smoking is much more injurious than cigar smoking, because the smoke is generally inhaled, and often ejected through the nose. It has a particularly harmful local effect on the mucous membrane of the nasal passage. People who use cigarettes are more liable than others to be afflicted with local irritations that produce catarrh. In persons of nervous temperaments the doctors say cigarette smoking always produces constitutional effects. The pulse is increased in frequency, is smaller than is natural, and is irregular. Such persons are said by physicians to have a "tobacco pulse," and a "tobacco heart." The action of the pulse in this respect is not to be mistaken. Persons who constantly smoke cigarettes are said by physicians to be easily excited, and to have a ten-

dency to vertigo and dimness of vision, besides being troubled by dyspepsia. Bronchial and throat diseases are much more readily caused by cigarette smoking than by cigar smoking, and during the last six or seven years a large increase in diseases of the air passages, due alone to this habit, has been observed. Physicians state that there is not one-fiftieth as much of the mucous surface covered by cigar smoke as by the inhaled smoke of a cigarette. Excessive indulgence in any form of tobacco smoking may produce general paralysis, while by enfeebling the circulation, lowering the vitality of the system, and interfering with assimilation of food, it tends to produce anemia, which is one of the first steps towards softening of the brain. Vertigo, when resulting from smoking strong cigars, or from the inhaling of cigarette smoke, is due anemia, or in other words to a diminishing supply of blood to the brain.

By some it is claimed that the paper wrapping of cigarettes is as hurtful as the tobacco. This claim is grounded upon the belief that the products of the imperfect combustion of the paper or other vegetable fiber are pyrogallic and pyroigneous acids, which make their presence unpleasantly felt in the mucous membrane.

Cure for Burns.

Glycerine, which may be considered the ethereal part of oil, has the property of penetration to a most remarkable degree; it penetrates the solid bone. Being thus penetrating, it is recommended by *Hall's Journal*, as the very best application for all feverish sores, for inflamed or dry surfaces simply from its quality of penetration and want of evaporation; the first and highest value of any poultice is its capability of keeping moist for the longest time; no one ever thinks of a dry poultice; glycerine keeps a part moist longer than any substance known, hence its value as above, mixed with an innocuous dry powder, called eub-nitrate of Bismuth, so as to make a thin paste or poultice. It is one of the very best applications known for burns, whether in children or adults, giving an almost instantaneous relief from suffering, by its entire exclusion of the air and by its moistening, hence cooling, soothing effects, promotes a speedy healing process, always safe, simple and efficient. A few cents will buy half a pound of it at any good drug store, and every family should have some at hand, in a bottle, plainly labelled, with a bottle of glycerine at its side.

A SIMPLE REMEDY FOR CINDERS IN THE EYE.—Persons traveling much by railway are subject to continual annoyance from the flying cinders. On getting into the eyes they are not only painful for the moment, but are often the cause of long suffering, that ends in a total loss of sight. A very simple and effective cure, is within the reach of every one, and would prevent much suffering and expense, were it more generally known. It is simply one or two grains of flax seed. They may be placed in the eye without injury or pain to that delicate organ, and shortly they begin to swell and dissolve a glutinous substance that covers the ball of the eye enveloping any foreign substance that may be in it. The irritation or cutting of the membrane is thus prevented, and the annoyance may soon be washed out. A dozen of these grains stowed away in the vest pocket may prove, in an emergency, worth their number in gold.

FOREIGN BODIES IN THE STOMACH.—*L'homme a la fourchette*, so famous in Paris a year or so ago, is distanced by a man in Australia now undergoing imprisonment for being unable to restore a gold ring which he swallowed, being to the prosecutor. He is being treated by the visiting surgeon of the jail with the view of making him disgorge a large steel Albert chain and a common brass ring. The chain can be distinctly felt at the bottom of the stomach, and the prisoner states it is now nine months since he swallowed it, and it is the only one he has had any difficulty about. The jailor has a collection of objects, such as Albert chains, penknives, and rings, which he has procured by making him vomit by emetics. The prisoner is an intelligent young man of twenty-three.

COFFEE AN ANTIDOTE FOR STRYCHNIA.—In a foreign journal are given the details of some experiments made by Dr. A. Lelli on the antidotal power of coffee against strychnia. The experiments were made in consequence of Dr. Lelli having met with a case in which a large dose of strychnia was administered in coffee without fatal consequences resulting. The animals employed were rabbits, and by comparative trials he found that a dose of five centigrammes proved fatal in a short space of time; when the same or a larger dose was given in a very strong infusion of coffee, he found that the coffee either acted as a complete antidote in preventing the poisonous effects of the strychnia, or that it materially diminished the violence of the action.

IN-GROWING TOE NAILS.—These afflictions are a source of excessive discomfort and sometimes of almost insufferable pain; formerly the savage mode of treatment was to take a pair of pincers and drag the whole nail out, but now a prompt and painless cure may be effected simply by inserting the dry sesquichloride of iron between the nail and the flesh and powdering the latter with it also, then apply a dry bandage, and a cure follows after two or three applications, a day or two apart.



W. B. EWER.....SENIOR EDITOR.

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SAN FRANCISCO:

Saturday Morning, March 9, 1878.

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The Week.

Three or four days of almost continuous rains, such as we have had the past week, is something unusual thus late in the month of March, and, taken in connection with the quantity of water that had previously fallen this season, has had a depressing effect on business generally. Despite this addition to our winter storms, the water in the flooded valleys has been steadily falling, the late precipitation having consisted of snow on the higher mountains. From this a double benefit has resulted; this snow forming a water reserve for the use of the miners next summer, while it checked to that extent any further additions being made to the water covering the valley below. The injury caused to the inhabitants of the submerged districts, while very great, will hardly reach the extent anticipated a week ago, as much of the flooded grain will probably escape irreparable injury on account of this earlier subsidence of the waters. Some fields of grain, and also of alfalfa, will be injured but little, while no inconsiderable amount of land will be greatly benefited by the sediment left behind by the retreating waters.

Local Mining News.

As will be observed, we make up a weekly summary of mining news from all parts of the Pacific and interior mining regions. For this class of information we rely wholly upon our exchanges published in the various mining localities throughout these districts. But so it is, in depending upon these, our contemporaries, for items concerning the mines in their respective districts, we sometimes find ourselves leaning upon a broken reed. They come to us, the most of them, large and handsome sheets replete with reading matter. We open them, hoping to find a goodly array of facts and figures touching the great industry in which their proprietors would naturally be supposed to take a deep interest. We scan them carefully, column after column, but find nothing suited to our purpose. There are paragraphs about all sorts of local matters except the mines. There are glowing accounts of the last fandango—items about dog fights and man fights and domestic brawls of every kind, but scarcely a word about the mineral wealth of the district or this progress of mining. This subject is ignored or dismissed with a line or two, leaving us to infer that nothing is being done towards developing the resources of the country, or that they are too insignificant to entitle them to mention. With this silence, or only these meager accounts of the mines, these journalists cannot reasonably complain if outsiders arrive by implication at the conclusion that the business of mining is at a low ebb or the natural wealth of the region not worth inquiring about.

Will not our mountain contemporaries amend this practice and see that every issue of their paper contains such a variety of short, well-written paragraphs, as will convey to parties abroad some definite notion as to the extent and character of the mineral deposits found in their vicinity, discoveries made, progress of mining, etc., to the end that we, being ourselves enlightened, may become a means of enlightenment to others on these points.

Hydraulic Gravel Elevator.

In the MINING AND SCIENTIFIC PRESS of July 21st, 1877, we illustrated and described the Cranston hydraulic gravel elevator for gravel mining, now in use in several places in this State. It is a machine by which water is made to carry gravel up hill. To accomplish this and impart the requisite velocity to the water and gravel a closed flume is constructed on an inclination upward, with a horizontal ground section made of cast iron, and a hydraulic nozzle introduced into a chamber in the ground section of the machine and the nozzle pointed in the direction it is desired to make the water and gravel go. This ground section has an open end, back or behind the nozzle, where the water and gravel enters the machine. The gravel passes through the machine at a high rate of speed, which is an essential feature of its success. It is intended more particularly to develop deposits lying in creeks, basins and flats too low to be worked by bedrock tunnels, cuts or drains, so as to save hoisting the gravel to the surface by whim or derrick.

One of these machines has been put in operation recently at Columbia, Toulumne county, and the following letter to Mr. Hendy, the agent in this city, gives the result of its operations:

COLUMBIA, TOLUMNE CO., CAL.,

February 10th, 1878.

JOSHUA HENDY—Dear Sir: I got the machine started yesterday, and it is a perfect success. It is 30 feet under water when I started it, and it moved off without a grunt.

There were 10 men here to see it start. They all said it would be another Douglas Flat arrangement, so I thought best to make them take back their silly talk, and they all weakened on what they have said and go their pile on the machine.

I run through 400 cubic yards of gravel in 10 hours, yesterday, and know that I can improve on that, but that is good enough.

I am raising my gravel 30 feet and even inches, and can raise it 40 feet; then 350 inches of water will carry it off in a three-foot flume, with six inches grade to the box. This I did yesterday, in the presence of five men, as a test, to show them what the machine would do. They all agree with me that the machine is a success. Yours truly, (signed)

JAMES BARRAN.

METEOROLOGICAL SUMMARY FOR FEBRUARY.—The report of the U. S. Signal Service office, of San Francisco, for the month of February is summarized as follows: The mean height of barometer for the month was 29.996; mean temperature, 53° 24; mean humidity, 74.1; prevailing winds, southeast; highest barometer, 30.333; lowest, 29.498; highest temperature, 65°; lowest, 45°; monthly range, 20°; greatest velocity of wind, 32 miles per hour; total number of miles traveled by wind, 6,129; total rainfall, 12.52 inches. Rainfall in February during former years; 1872, 6.90 inches; 1873, 3.94 inches; 1874, 2.31 inches; 1875, 8.32 inches; 1876, 4.92 inches; 1877, 1.18 inches.

THE Nova Scotia mines yielded 8,200 ounces of gold last year.

The Banking Spirit Strong in Jail.

There are many things that people do not understand in this matter, and I think I can save more for the depositors than it appears they will get now, if they will only let me try.

Thus spake the captured culprit J. C. Duncan, after the long bunt of the detectives had fixed him behind the bars. We hardly question the accuracy of the statement, because we believe that no one knows better than the arch-conspirator the avenues along which he scattered the depositors' money, nor could any one display a keener scent in pursuing all remaining traces of the treasures. If the unfortunate old man possesses a contrite heart, we should be inclined to rely upon the skill he claims, on the principle that the converted thief makes the best detective, and the reformed drunkard the most vivid portrayer of the horrors of intemperance. But this is not the point we would make by allusion to his jail-horn declarations.

We have credited him with the 'banking spirit' still strong within him. Of course we do not allude to the true spirit which inspires upright financiers who make their banks the bulwarks of our commercial life. We refer rather to that style of banking which late events have shown is far too prevalent all over the country, and of which Duncan is a typical embodiment. How plainly Duncan's words describe the spirit and methods of fraudulent banking which have already made thousands mourn. It hints at what may be termed the personal element in banking methods; an autocracy which rises above all responsibility; which discards the cramped systems of the book-keeper, and which makes as little account of the thousands entrusted by frugal depositors as the generous man does of dimes at a church fair. Is it any wonder when such a spirit and such methods prevail in savings institutions that assignees find no trace of assets on the books, and the incarcerated hanker hoists that he can save more than any one else from the shapeless financial wreck? What a commentary is this on the stability of institutions into which men are led by laudable motives of economy and frugality to cast their earnings, with assurance that they shall receive them with all the increase which the money earns.

And mark, we have as yet not hinted that there is aught of criminality in the method. Is there need to label things as crimes which outrage all the senses of truth and integrity which mankind possesses. What would we think of the clerk who cast our moneys received, into the pocket of his pantaloons, and registered neither receipts nor disbursements. And yet here is a man who stood before the community as the custodian of sacred trusts, boasting that there are portions of the people's property which records do not show, and which he alone can discover. It might seem that this was but the effort of a repentant spirit to restore all within its power to those whom its deeds had wronged, were it not that other declarations of the man disclaimed the consciousness of wrongdoing.

Whatever of force there may be in these suggestions is in support of the truth that no people is true to itself which allows such methods of handling trusted funds the possibility of existence. Certainly we have had enough of a style of banking which enables a man to throw our money into a hole and then push the hole in after it, leaving us naught in view but the brazen cheek of his effrontery, and the consolation of a boast that none but he can gain us even a fragment of it.

Ready to Receive Silver Bullion.

The Silver bill having been passed and being now a law, the Government is actively engaged in carrying its provisions into effect, which will be greatly productive of benefit to the mining interests of the coast. Under direction of Acting Cashier Whelpley, the vaults of the U. S. Treasury are being arranged for the reception of a large quantity of silver now in the Mint at Philadelphia. Seven hundred thousand dollars, the weight of which will approximate 40,000 pounds, will be received at the Treasury in Washington in the present month. Its removal from Philadelphia is for the purpose of affording space for the bullion from which the new silver dollars will be coined.

The following circular relative to the purchase of silver bullion, has been issued this week, by the Director of the Mint and Secretary of the Treasury:

TREASURY DEPT., OFFICE DIRECTOR MINTS, }
WASHINGTON, March 6th.

Notice is hereby given that the Treasury Department is prepared to receive at all times offers in writing or by telegraph for the sale of silver bullion in quantities of not less than 10,000 ounces, deliverable at the Mints of the United States at Philadelphia, San Francisco and Carson. All offers will be addressed to the Director of Mints at Washington, and will state the quantity, price per ounce, 1,000 fine, and when the delivery will be made if the offer is accepted. The value of the silver purchased will be determined by Mint assay, and until further notice payment will be made in gold or silver coin of full legal tender. Where bullion is offered and purchased which is of a character requiring parting or refining, the seller will pay the usual Mint charges.

H. R. LINDERMAN, Director of Mints.
Approved: JOHN SHERMAN, Secretary of the Treasury.

Sewer Gas and the Sanitary Aspects of Plumbing.

The ratio of deaths from zymotic diseases for this last fiscal year in this city, was 34.8% of this total mortality, against 19.1% for the previous year, an increase of over 15% in the total mortality. The whole number of deaths from zymotic diseases for the fiscal year last past, was 2,148, against 930 for the previous year, an increase of 1,218, a sad record of deaths from diseases which for the most part might easily have been prevented.

The object of sewers is to remove human excreta, house refuse, and other organic matter in the shortest possible time, and, if feasible, before decomposition has taken place. To effect these objects sewers should be constructed of the best material, and be suitably located, while the pipes leading into them should be thoroughly ventilated. The subject of ventilation being one of the utmost importance, since without this any system of sewerage is not only imperfect, but exceedingly deleterious to the public health, and dangerous to the human life.

How to prevent the escape of the mephitic gases generated in sewers into our habitations, while it is a matter of the greatest importance, is still but little understood. It can be accomplished only by proper ventilation and efficient traps. The ordinary traps are frequently worse than useless, giving a feeling of safety which does not exist, and thereby endangering the lives of those inhabiting the houses into which they are introduced. Not only are they subject to syphonage, but from causes heretofore alluded to, sewer air becomes so compressed as to force the pestilential gases through air-tight traps, hence the necessity for thorough ventilation of waste pipes in houses that connect with the sewers.

It is a well-known fact that nine-tenths of the houses in this city, and elsewhere, that contain water-closets, sinks, wash-trays, bathtubs and wash-stands, have no air pipe leading from the waste pipes that connect them to the sewer, and without their being ventilated the traps are worse than useless. To run air pipes from the various water-closets, wash-stands and sinks, would necessitate the tearing up of work already done, taking up carpets, spoiling ceilings, and damaging woodwork, besides being a very expensive job to perform.

The invention of Mr. Morey, a mechanic of this city, is one of the most simple yet devised for preventing the syphonage of traps we have seen, and the only wonder is that it has never been discovered before. On the next page we give engravings, and the following is the description of this invention, which is patented.

It is soldered on traps already in use at the highest part of the bend, any tendency of the water passing through the discharge pipe to create a vacuum causes the valve to lift, and the air rushes in to the pipe, destroying the vacuum and preventing the trap being drawn dry. The water ceasing to flow the valve drops by its gravity into its seat, forming an air-tight joint, preventing the escape of noxious vapors; the air passing to the valve is protected. Water cannot come in contact with the valve on account of the air cushion in the valve case. This improvement to the ordinary sewer trap is of easy application, is inexpensive and will effectually prevent the syphonage of traps.

It has been indorsed by Dr. Meares, health officer, and all of the medical and scientific men who have yet examined it, and is destined to work a great good in the sanitary improvements of our city.

It can be seen at the store of Mr. David Bush, 27 and 29 New Montgomery street (opposite the Palace hotel), who has it fitted up with a glass tube, so as to show its operation and afford all interested in sanitary matters a chance to inspect it for themselves.

Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening, Professor Davidson in the chair. A number of contributions to the library and museum were made.

The following new members were elected: Geo. W. Prescott (life), George E. Edwards, Charles Wehh Howard, Mrs. Charlotte Blake Brown, A. Wendell Jackson, Jr., Elizabeth A. Follensbee, Josiah Keep, John M. Stillman, Solon H. Williams and George Spaulding.

B. B. Redding read a paper on "Olive Culture in California," giving an account of the progress and importance of this branch of industry. Alexander Del Mar read a paper entitled, "Interest for Money," which traced the history of the market rates of interest for money from remote times to the present. In India, B. C. 1400, it was 15 per cent. per annum; ancient Greece, 8 to 12 per cent.; ancient Rome, 4 to 12 per cent.; Middle Ages of Europe, 1 to 70 per cent.; and from the discovery of America to the present time, 2 1/2 to 14 per cent., varying in particular countries and at particular periods. The course of legislation upon interest was alluded to, the speaker saying: "The most pernicious error of law and administration which flow from interest are those which are caused by regarding it as one homogeneous thing, whereas it consists chiefly of two widely different ones—the rate of growth and the degree of security—and as such it ought to be treated by the bench, and regarded in all legislation concerning loans of money."

Formation of the Placers of Cariboo.

[Written for the Press.]

The formation of the placers of Cariboo, British Columbia, is an interesting study. The practical miner has been sorely puzzled by it. Rules fitting other gold fields seldom, if ever, applied to it in practice, no matter how satisfactory in theory. The Australian and the California miner had much to learn in placer-craft in the gold fields of Cariboo. What wonder, then, that they should have adopted the indefinite and unreasonable law, that "gold is where you find it." This has naturally resulted in the performance of a vast amount of unintelligent work and a great waste of money. Cariboo never received that consideration at the hands of the scientific investigator which it earnestly invited, and which its virginity entitled it to. But the recent discoveries of gold-bearing quartz have dispelled many popular illusions regarding its placer formation.

The rock formation of the gold belt is talcose slate. The placers are constructed of its ruins—the legacy of the ice age. Every mountain bears evidence of ice action; every valley tells the story of the slow and silent gliding of the ancient glacier to the great basin now forming the valley of the Fraser river. On every mountain summit; on the flank of every hill, and in the depths of every gulch and valley the rounded pebble and the polished rock prevail. During the glacial epoch the Blue mountains of Cariboo were enveloped in a sheet of ice. This was the agent which molded them into their present shape.

The formation of the placers consists chiefly of three subdivisions: First, the debris of the ancient glacier lying in the bottom of its bed in the primitive rock, in the form of smooth gravel, well cemented by the sticky talcose, showing but trifling water action; second, the ruins of the walls of the glaciers, covering the debris of the glacier, and showing but little wash; third, sedimentary strata of recent origin, consisting of sand and gravel in alternate layers. In some places, especially in the lower portions of the creeks, where there is but little grade, the silting of the stream flowing from the decaying glacier formed a bed of quicksand on top of the primary deposit, before the walls of the glacier's bed began to crumble and slide in.

The first named stratum only is auriferous; or, properly speaking, it is the only stratum containing gold in paying quantities, the surface gravel carrying a small quantity of light, scaly gold. The discovery of the Bonanza and Steadman ledges explain the source of this gold, although in doing so it violently casts aside a popular theory long and zealously cherished. The highest peak in that section of the Blue mountains enclosed by the horseshoe of the upper Fraser river is the dome known as Bald mountain. It rises to an elevation of about 7,000 feet. It is the source of almost all the auriferous creeks in the district of Cariboo. William, Lightning, Antler, Grouse, Keithley, and other well-known creeks strike out from it in various directions like the spokes of a wheel from the hub. Each one of these creeks has yielded large quantities of gold, and Bald mountain has, consequently, been commonly regarded as the source of the precious metal; that the so-called leads were formed by the action of water, the gold-bearing gravel being carried by floods and deposited along the channel. But the spotted nature of the leads has always clashed with this hypothesis. Then again it has frequently been impossible to harmonize the aqueous theory with the facts, as for instance, where the deposit of gold is found on points where water would have actually been compelled to flow up hill.

I have taken the pains to reduce the map of William creek and surroundings, which was recently published in the MINING AND SCIENTIFIC PRESS, to better illustrate the manner in which the placers of Cariboo have been formed.

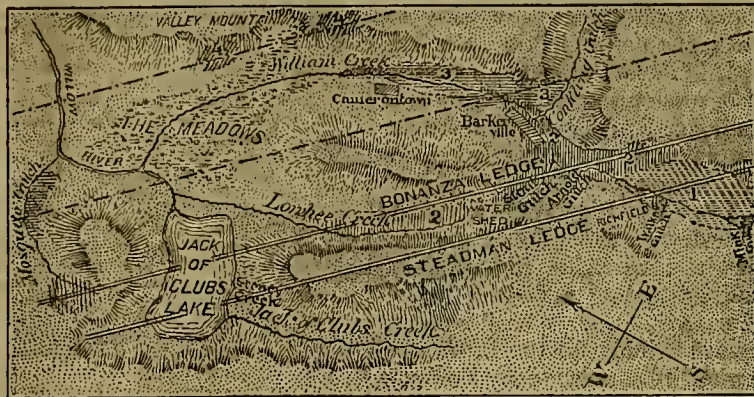
The double lines, running parallel eoutheast and northwest, represent the two ledges which have been discovered and partially prospected, both of them yielding moderately high-grade ore. The parallel dotted lines represent gold-bearing ledges, which there is every reason to believe exist, although I have no knowledge of either having yet been found.

From the mouth of Mink gulch, which is shown on the right-hand side of the above map, the deposit of gold in William creek was large to a point a short distance below Camerontown, and at the head of the flats known as "The Meadows." From Mink gulch to its source, nearly a distance of two miles, the creek was, however, almost barren. Below Camerontown and as far on "The Meadows" as mining operations have been conducted, the same conditions prevailed. The entire lead was not more than three miles in length. This was divided into three parts, each one having separate and distinct characteristics from the other. From Mink gulch to a point a little above Arnold gulch, gold of dull greenish color, carrying considerable silver and of low value, ranging from \$12 to \$14 per ounce, was obtained. While the bulk of the gold was found in the deep channel, it was also distributed in large quantities on the eastern slope, to the very summit of the hill forming the right bank. Above Arnold gulch a new description of gold entered the channel, and from there to Conkling gulch it predominated. It was a rich orange, whose market value ranged from \$17 to \$19 per ounce. The pay dirt

was, however, confined altogether to the deep ground. Opposite the entrance of Conkling gulch, another description of gold entered and predominated in the lead. It was lighter in color than either of the other two. This continued along the creek as far down as it paid for working, a short distance below Camerontown. The shading in the map and the accompanying numbers, 1, 2, 3, show these distinct divisions. Again, Conkling gulch paid largely for a few hundred feet, the lead suddenly disappearing at the head of the Ericson claim. From that point to the Meadows, forming its headwaters, the creek was comparatively barren and very spotted. At the headwaters, a distance of about one and a half miles from the upper end of the Ericson claim, another rich lead was discovered, carrying gold much different to that found at the foot of the creek. Opposite Conkling gulch, on William creek, gold was found in large quantities for a considerable distance up the hillside, forming the left bank, at an elevation of at least 50 feet above the main channel, which was also very rich. Stout gulch paid largely along its entire length, from the point where its channel blended with that of William creek to that point on the summit where it connected with the Lowhee Creek lead, running in an opposite direction. The latter creek paid nearly to its mouth, where the gold gradually gave out. A few hundred feet of ground paid well on Arnold gulch, an almost dry water course, flowing into William creek, from the left bank of the canyon. The

This accounts for the "spot" of auriferous alluvial which was found on the gulch at that point. The Black Jack mine, the middle of which was located where the old channel and the Bonanza ledge intersect one another was the richest part of this section of William creek. The reason has already been explained. From the mouth of Arnold gulch to the junction of Stout gulch, it will be observed that the present water course of William creek departs from the old channel, making a horse-shoe bend, while the latter continues a straight course. Evidently some time during the decay of the glacier either its own tailings or a slide from the right bank choked its channel and compelled it to swerve to the left. In that direction it wore a new channel in the rock, forming what is known as the canyon, lying midway between the towns of Richfield and Barkerville. It was in this canyon that Dutch William, the discoverer of the creek, and from whom it received its name, found gold in 1861. And in this canyon he located his Discovery claim, which proved to be the poorest on the creek. The reason is very evident. Only about 50 feet in length and not more than that in depth of the ledge had been eroded.

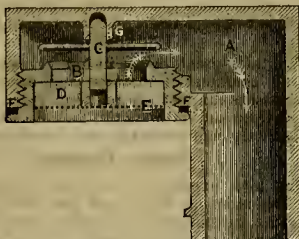
The result of the chief work of the glacier had been deposited in the channel which its own tailings had choked. Between the canyon and the earlier channel, a ridge of talcose slate stands, like a camel's hump in shape, at least 50 feet high and about a quarter of a mile in length. The Bonanza ledge is ex-



PLACERS AND QUARTZ LEDGES IN THE CARIBOO REGION.

posed in this canyon. Its gold-bearing character has been known as far back as 1862 or '63, but enterprise was wanting, until very recently, to undertake to work it. Up to the mouth of Conkling gulch, the channel received its principal supply of gold from the Bonanza ledge. About midway between Arnold and Conkling gulches, the William creek glacier was joined by another lateral glacier of greater magnitude than that of the first named gulch, running from the watershed almost to the mouth parallel with the ledge, and concentrating the latter's liberated wealth in the bottom of its channel. The auriferous placers in this gulch (Stout's) paid more

gold in Stout gulch, Lowhee creek and Arnold gulch corresponded with that obtained in William creek, from the mouth of Black Jack tunnel (opposite the junction of Arnold gulch) to Conkling gulch. A rich spot of gold, covering an area of several hundred feet in length and large breadth, corresponding in nature to the gold obtained in the Ericson claim, at the foot of Conkling gulch, was found in Mosquito gulch, at least five miles distant. On the south flank of Valley mountain, a spot of gold placer was found and another on the bench forming the east bank of William creek, about half a mile east of Camerontown, both of which corresponded with



DEVICE FOR PREVENTING SIPHONAGE OF SEWER TRAPS.

the gold deposit at the head of Conkling gulch. Red gulch, one of the branches of Mosquito creek, contained a rich gold deposit which corresponded with the gold obtained in Lowhee creek and Stout gulch.

With the knowledge of the existence of at least two gold ledges, and the general course they follow, these peculiarities in the placer deposits are readily explained. Anyone examining the subjoined map will understand, I believe, the manner in which these placers have been supplied with gold from the ledges intersecting the various creeks and gulches represented in it. The glacier intersected the Steadman ledge at a point opposite the mouth of Mink gulch. Obeying the law of gravitation as the process of attrition progressed the particles of gold released from the ledge descended to the lower level of the channel of the glacier. The detritus of Steadman ledge thus followed the course of the moving glacier to within a few hundred feet of the head of the canyon at the mouth of Arnold gulch. At the point where the ancient channel crosses the ledge, the alluvial deposit was naturally richer than anywhere else on this section of the creek, a greater quantity of auriferous matter having been reduced there. It was there that the Steele claim was located. The extraordinary yield of that claim received worldwide publicity. The Bonanza ledge was entered at a point on the right bank a little south and opposite the mouth of Arnold gulch, contributing to the channel its quota of gold. A lateral glacier flowing down Arnold gulch intersected the same ledge on the hillside, forming the left bank of William creek.

uniformly than those of any other creek or gulch in Cariboo, not a break occurring in what was by common consent called "the lead" from the divide to the junction with the William creek channel. The wealth of the claims on Stout gulch was graduated, corresponding with the probable amount of erosion of the ledge. Lowhee creek showed the same characteristics to within a short distance of its mouth, where the lead gave out, or as it has been erroneously believed, was "lost." We now understand the reason why it was lost: The course of the Lowhee glacier diverged from the ledge, the source of gold supply, some distance before entering the basin now forming Jack-of-Clubs lake. Red Gulch, the eastern branch of the headwaters of Mosquito creek, which flows on the west side of Island mountain, was also auriferous, and became so, no doubt, by the erosion of Bonanza ledge, which crosses it not far from the summit. On Red gulch it may be remarked, outcroppings of the Bonanza ledge were discovered as early as 1867 or 1868, by a Frenchman, who extracted considerable gold from the rock by the simple process of pulverizing in an ordinary mortar, and washing in an ordinary gold pan.

A more promising creek, in external appearance, does not exist in Cariboo than the Jack-of-Clubs creek. But it is entirely barren. Hundreds of thousands of dollars have been spent on it, but gold in paying quantities has not been found. No part of the valley of the Jack-of-Clubs creek is intersected by either the Bonanza or Steadman ledges; and probably no other gold-bearing ledge of any magnitude intersects it either.

More money has been fruitlessly spent on Conkling gulch than any other in the district. The Ericson claim, almost at the foot of the gulch, was the only one which paid for working. It was the richest mine in Cariboo. Over 1,100 ounces of gold was taken out of it in 24 hours—two shifts—12 men working. The claim ran along the line of a quartz ledge, which I have marked as undiscovered—such, so far as I am informed, being the case. Opposite the mouth of the gulch, the entire width of William creek paid largely, and well up the western slope besides. Wherever any gravel lodged on the latter it was sure to be "lousy" with gold. This came lead revealed itself—or rather the presence of the same ledge was made manifest—in the Minnehaha claim on the lower portion of Mosquito gulch. As the workings on William creek and Mosquito gulch departed northward from the line of this ledge, the pay weakened, almost giving out in each case before reaching the meadows. Above the Ericson claim on Conkling gulch, the ledge strikes into the hill and has been but triflingly eroded. Hence the barrenness of the channel up stream.

The presence of another ledge is betrayed at the base of Valley mountain, where a spot of auriferous placer was found, and in the Lillooet claim about half a mile east of Camerontown, and on the meadows of Conkling gulch, which is not represented on the map. These three points are in a line. At neither of them is there any channel, only well-worn bedrock and smooth auriferous gravel cast over a broad area. On the Conkling meadow the ledge was ground down by the edge of the Conkling glacier. The deposits at the foot of Valley Island and on the east bench of William creek were formed by the attrition of the edges of a large field of ice which united with the William creek glacier and forced the latter westward until it joined the main ice stream of Willow river.

In other sections of the district there are evidences of other ledges. For instance, on Lightning creek a rich gold-bearing ledge was no doubt intersected by the ancient glacier which formed the present valley, in the vicinity of what is known as the Discovery bench. A few hundred feet above the Discovery bench very little gold has been found, notwithstanding the most thorough exploration.

From the Discovery bench down to Van Winkle, the ledge probably follows the line of the creek on the left bank. I arrive at this conclusion from the fact that, wherever a projecting ledge of rock exists on the left bank, in the immediate vicinity of the present water-course, deposits of highly auriferous gravel have been found. Below Van Winkle for about one mile, there are evidences that the ledge follows the present line of the creek, for gold in large quantities has been found for about that distance only. Still lower down Lightning valley changes its course and the channel has been found to be almost barren. Another ledge undoubtedly crosses several of the southern tributaries of Lightning creek; for at about an equal distance from the mouth, the channels of these streams have paid largely. The remaining portion of these gulches have been barren. Such was the case with Van Winkle. Poorman, Last Chance and Anderson creeks—all southern tributaries of Lightning.

Grouse and Antler creeks are illustrations of a similar character. A small basin about half a mile in length was all that paid on Antler creek, and that was remarkably rich in gold. On the right bank the auriferous gravel was so scant that the gold nuggets cropped out among the grass roots. On Grouse creek, the Heron claim, some 800 or 1,000 feet in length, was all that contained gold in paying quantities. The pay gave out as abruptly up stream as it did down stream. No doubt the creek is crossed at right angles or thereabouts by a rich gold-bearing ledge in the neighborhood of the upper lines of the old Heron claim. Antler creek derived its gold in the same way. It is not at all unlikely that both creeks are crossed by the ledge which I believe exists at the base of Valley mountain and at the head of Conkling gulch, because they lie within the direct course of such a ledge.

From these facts I draw the following conclusions: 1. No such thing as a continuous placer lead exists in Cariboo as in Australia and California, for the reason that the forces which have been at work forming them are different. 2. That wherever a rich placer deposit has been found, an equally rich gold-bearing ledge exists in its immediate vicinity. 3. That the placer leads while broken and disjointed may be traced with unerring accuracy by the general direction of the gold-bearing ledges feeding them, and that where the erosion of the ledges has been greatest there will be the richest alluvial deposit. On this account, if for none other, portions of Jack-of-Clubs lake ought to be exceedingly rich, inasmuch as it is intersected by the gold-bearing ledges—the Bonanza and the Steadman—and the erosion has been greater there than on any other point along their entire length so far as traced.

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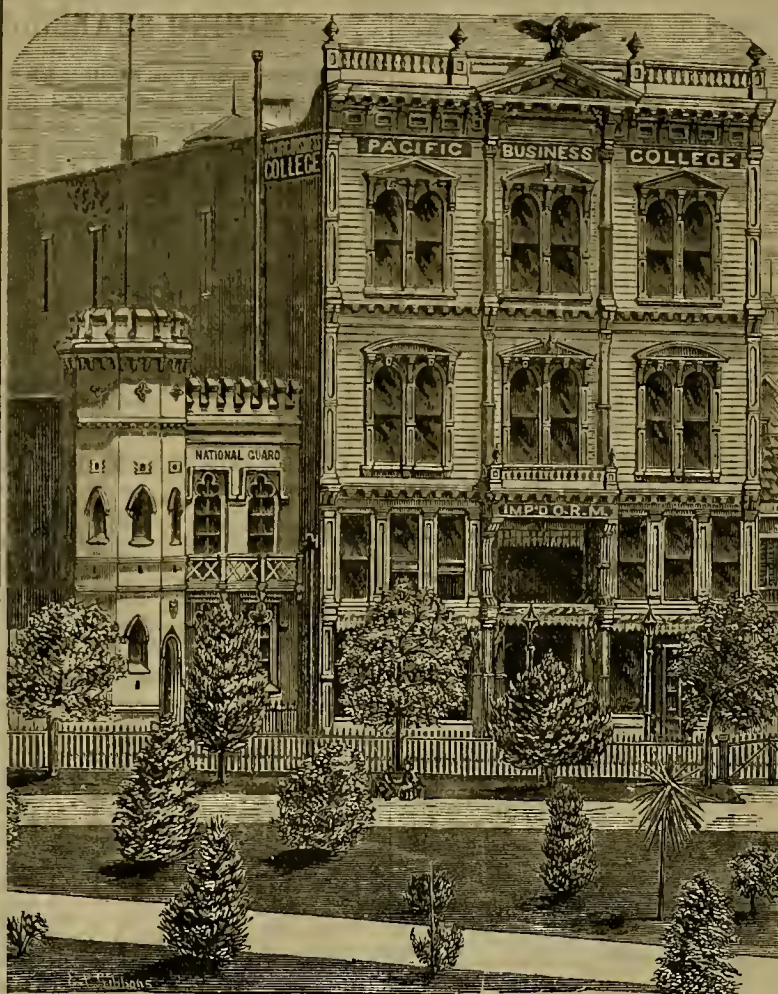
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Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Feb. 14.	Week Ending Feb. 21.	Week Ending Feb. 28.	Week Ending Mar. 7.
Alfa.	104	104	104	111
Alta.	81	81	81	74
Ades.	79	79	79	74
Alps.	5	31	21	2
Argenta.	1.05	650	800	750
Baltimore Con.	1.80	41	1.10	1.50
Belcher.	55	60	50	70
Belmont.	181	171	171	201
Best & Belcher.	44	31	3.65	51
Bullion.	9	81	9	9
Bechtel.	11	3.80	1.20	1.30
Bodie.	2.60	2.15	2.20	2.30
Benton.	3.60	2.15	2.20	2.30
California.	231	271	281	291
Challenger.	750	700	750	750
Chollar-Potosi.	35	31	31	31
Confidence.	700	650	650	650
Con Imperial.	231	221	221	221
Con Virginia.	41	41	41	41
Crown Point.	41	41	41	41
Dayton.	231	231	231	231
DeFrees.	1.15	600	750	1.00
Eureka Con.	401	391	401	401
Exchequer.	2.55	2.35	2.35	2.35
Endowment.	350	350	350	350
Grand Prize.	131	121	121	121
Gila.	600	600	600	600
Golden Chariot.	98	98	98	98
Gould & Curry.	10	10	10	10
Hale & Norcross.	10	10	10	10
Hussey.	900	900	900	900
Julia.	2.40	2.35	2.35	2.35
Justice.	111	111	111	111
Joe Scates.	500	300	300	300
K & K Con.	4	3	3	3
Kosuth.	100	100	100	100
Leach.	550	300	300	300
Leopard.	200	150	150	150
Leviathan.	2.20	2.15	2.15	2.15
Leeds.	100	250	300	300
Modoc.	150	250	300	300
Mountain.	250	250	250	250
Meadow Valley.	131	131	131	131
Mexican.	131	131	131	131
North Con Virginia.	700	400	800	800
New York.	1.80	1.80	1.80	1.80
Northern Belle.	11	101	101	101
New Oso.	1.60	1.1	1.75	1.60
Navajo.	1.55	1.15	1.70	1.60
Occidental.	500	500	500	500
Ophir.	151	161	141	141
Overman.	400	500	500	500
Panther.	400	500	500	500
Raymond & Ely.	51	4.90	51	51
Rock Island.	50	101	101	101
Savage.	121	25	26	26
Seg Belcher.	27	25	26	26
Sierra Nevada.	4.35	3.95	4.15	4.15
Silver Hill.	21	2.60	2.60	2.60
Succor.	2	41	3.05	2.30
Star.	2	41	3.05	2.30
Trojan.	700	500	600	600
Union Con.	6	51	6	6
Wells-Fargo.	111	111	111	111
Woodville.	600	350	350	350
Yellow Jacket.	101	101	101	101

Sales at S. F. Stock Exchange.

Friday A. M., Mar. 1.	270 Alfa.	111	270 Alfa.	111
185 Alta.	341	341	341	341
100 Andes.	700	400	400	400
100 Aloha.	101	101	101	101
600 Bullion.	1275	1275	1275	1275
305 Best & Belcher.	24	100	100	100
140 Benton.	1.15	300	300	300
1130 Belcher.	4.50	400	400	400
150 Chollar.	1.40	1.40	1.40	1.40
350 California.	2.20	550	550	550
535 Con Virginia.	2.21	400	400	400
825 Crown Point.	5.45	270	270	270
1030 Con Imperial.	7.00	630	630	630
320 Caledonia.	1.40	1.40	1.40	1.40
50 Confidence.	5	20	20	20
50 Challe ge.	850	150	150	150
950 Gould & Curry.	9.40	835	835	835
325 Hale & Nor.	101	100	100	100
670 Justice.	101	100	100	100
350 Julia.	2.30	616	616	616
900 Kentuck.	31	300	300	300
280 Mexican.	131	131	131	131
255 Morning Star.	11.21	750	750	750
1275 New York.	1.40	1.40	1.40	1.40
335 Ophir.	54	60	60	60
85 Overman.	15.10	795	795	795
1030 Savage.	12.10	400	400	400
340 Sierra Nevada.	4.45	240	240	240
40 Seg Belcher.	2.40	700	700	700
360 Silver Hill.	2.40	700	700	700
630 Succor.	2.70	630	630	630
200 Trojan.	7.00	700	700	700
1130 Union Con.	6	100	100	100
10 Utah.	101	101	101	101
360 Utah.	11	11	11	11
400 Woodville.	11	11	11	11
100 Wells-Fargo.	101	101	101	101
110 Yellow Jacket.	101	101	101	101
70 Yellow Jacket.	101	101	101	101
AFTERNOON SESSION.				
545 Alfa.	3.21	100	100	100
255 Alta.	8.10	100	100	100
450 Argenta.	70	70	70	70
1140 Best & Belcher.	23.40	400	400	400
100 Belmont.	550	550	550	550
2000 Belle Isle.	550	550	550	550
85 Bullion.	61	61	61	61
285 Con Virginia.	22.20	230	230	230
355 California.	22.20	100	100	100
450 Crown Point.	9.45	50	50	50
70 Chollar.	1.40	1.40	1.40	1.40
230 Con Imperial.	7.00	500	500	500
520 Caledonia.	2.20	300	300	300
570 DeFrees.	5.50	300	300	300
1600 Day.	9.50	600	600	600
1000 Endowment.	7.00	300	300	300
375 Eureka Con.	4.01	400	400	400
120 Exchequer.	3.40	1750	1750	1750
130 Grand Prize.	12	120	120	120
200 Gould & Curry.	9.40	285	285	285
150 Gen Thomas.	100	100	100	100
60 Golden Chariot.	100	100	100	100
185 Hale & Nor.	101	101	101	101
350 Hornet.	20	20	20	20
200 Hussey.	550	2750	2750	2750
500 Hamburg.	3.40	3.40	3.40	3.40
150 Justice.	101	101	101	101
445 Julia.	2.45	520	520	520
300 Leeds.	1.40	650	650	650
100 Leopard.	250	650	650	650
70 Mexican.	131	131	131	131
720 Modoc.	100	100	100	100
20 Martin White.	1.40	1.40	1.40	1.40
660 New York.	1.35	1.35	1.35	1.35
505 Northern Belle.	101	101	101	101
350 Navajo.	1.90	1490	1490	1490
135 Ophir.	5.40	500	500	500
150 Overman.	15.10	230	230	230
100 Panther.	30	30	30	30
170 Raymond & Ely.	5.05	75	75	75
325 Rye Patch.	4.00	400	400	400
675 Star.	12.10	220	220	220
200 Sierra Nevada.	4.55	300	300	300
1325 Silver Hill.	7.00	800	800	800
100 Silver Hill.	2.20	300	300	300
1550 Trojan.	7.00	230	230	230
315 Union Con.	3.40	1065	1065	1065
2550 Young America.	3.40	520	520	520
30 Yellow Jacket.	11.10	780	780	780
310 Alta.	7.00	350	350	350
180 Andes.	70	70	70	70

375 Savage.	121	220	Eureka Con.	391	401
375 Solid Silver.	51	220	Exchequer.	4.60	4.65
100 St Louis.	500	1500	Falcon.	75	800
355 Silver Hill.	21	1740	Grand Prize.	102	101
200 Senator.	4.00	110	Gould & Curry.	9.40	9.40
400 Trojan.	650	3295	Gila.	600	600
60 Utah.	121	550	Hussey.	1.10	1.10
145 Union Con.	6.00	20	Hamburg.	3.35	3.35
220 Woodville.	6.00	1100	Independent.	800	800
1120 Ward.	1.05	905	Justice.	9.90	9.90
300 Wells-Fargo.	100	190	Julia.	2.45	2.45
50 Yellow Jacket.	101	100	Jackson.	1.00	1.00
AFTERNOON SESSION.			Leeds.	1.40	1.40
2670 Argenta.	600	1530	Leopard.	350	350
540 Alps.	2.60	400	Modoc.	100	100
220 Alta.	3	50	Mexican.	131	131
335 Best & Belcher.	21	400	Meadow Valley.	200	200
530 Belmont.	45	258	Manhattan.	10	10
50 Bodie.	850	100	Martin White.	51	51
500 Belle Isle.	450	50	Northern Belle.	9	9
470 Bullion.	61	1520	Navajo.	1.80	1.80
415 Con Virginia.	22	330	Ophir.	53	53
600 California.	30	20	Raymond & Ely.	5.05	5.05
50 Confidence.	5	625	Star.	2.61	2.61
500 Con Imperial.	700	2450	Silver Prize.	75	75
240 Cord & Curry.	9.40	100	Sierra Nevada.	4.55	4.55
30 Chollar.	34	34	S. & C.	112	112
685 DeFrees.	40	500	Senator.	4.10	4.10
250 Day.	250	1	Seg Belcher.	3.45	3.45
430 Eureka Con.	41	140	Union Con.	3.40	3.40
400 Raymond & Ely.	45	280	Ward.	1.40	1.40
320 Endowment.	700	300	Young America.	3.50	3.50
100 Falcon.	900	900			
1315 Grand Prize.	12	12			
450 Gila.	600	550	Andes.	70	70
500 Hamburg.	3.40	3.40			
2000 Hussey.	1.10	1.10			
500 Hornet.	250	250			
200 Idaho.	100	100			
335 Independent.	9.90	420	California.	30	30
230 Justice.	9.90	1245	Con Virginia.	22	22
170 Julia.	2.40	100	Crown Point.	5.40	5.40
240 Leeds.	2.61	40	Chollar.	1.40	1.40
300 Modoc.	100	100			
1020 Modoc.	700	615	Caledonia.	22	22
85 Mexican.	131	200	Challenge.	800	800
500 Meadow Valley.	200	400			
500 McCracken.	4.70	4.70			
200 Martin White.	51	51			
300 Navajo.	1.80	40	Hale & Nor.	9	9
350 Northern Belle.	101	101			
200 Overman.	15	350	Joe Scates.	300	300
200 Panther.	300	300			
200 Raymond & Ely.	5.05	5.05			
1200 Silver Prize.	75	75	Leviathan.	350	350
175 Star.	2.61	2.61	Mexican.	131	131
30 Silver King.	131	1045	New York.	1.10	1.10
50 Silver Hill.	21	350	Ophir.	53	53
1650 Succor.	20	20			
925 Tiptop.	31	31	Savage.	11	110
600 Trojan.	600	570	Sierra Nevada.	4.50	4.40
20 Union Con.	3	225	Solid Silver.	5.45	5.45
4300 Young America.	3.50	100	Silver Hill.	2.20	2.20
Tuesday A. M., Mar. 5.					
310 Alta.	7.00	450	Succor.	2	2
70 Andes.	70	350	Seg Belcher.	3.45	3.45
200 Best & Belcher.	21	400			
550 Best & Belcher.	22	135	Utah.	11	11
1140 Con Imperial.	70	105	Union Con.	3.40	3.40
410 Crown Point.	5.40	150	Woodville.	650	650
15 Chollar.	1.40	34			
120 Con Virginia.	22	230			
1250 California.	30	30			
145 Caledonia.	2.20	2.20			
500 Con Washoe.	450	355	Alta.	7.00	7.00
35 Challenge.	750	350	Alps.	2.60	2.60
200 Dayton.	200	200			
250 Gould & Curry.	9.40	850	Bodie.	850	850
450 Hale & Nor.	101	100	Belle Isle.	450	450
1710 Justice.	9.90	200	Belmont.	400	400
405 Julia.	2.40	440	Bullion.	61	61
230 Joe Scates.	300	510	California.	30	30
900 Kentuck.	31	510	California.	30	30
400 Leviathan.	350	550	Con Virginia.	22	22
290 Mexican.	131	131	Chollar.	1.40	1.40
250 Morning Star.	1.40	34	Caledonia.	2.20	2.20
340 New York.	1.40	1.40			
250 Overman.	15	150	DeFrees.	3.50	3.50
60 Ophir.	53	250	Day.	2.50	2.50
100 St Louis.	500	100	Eureka Con.	391	391
515 Sierra Nevada.	4.55	350	Exchequer.	4.60	4.65
785 Savage					

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING, FEBRUARY 19TH.
 SCREEN.—J. H. Chavarras, S. F.
 STOP-COCK.—J. L. Heald, Vallejo, Cal.
 BEE-FEEDING DEVICE.—E. Carter, Folsom City, Cal.
 FUMIGATOR.—F. Hanson, Nevada City, Cal.

RE-ISSUES.
 CASE FOR TRANSPORTING EGGS.—J. L. and G. W. Stephens, S. F.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.
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Mr. W. B. Ewer, the oldest member of our firm, became interested in the office in 1862, and Mr. A. T. Dowey in 1863. The former is well known as senior editor of the journals belonging to the house, and the latter as the general business manager of the firm.

Mr. George H. Strong (who has for some time been the managing partner in the Patent Department) connected himself with the office in 1863. With the exception of one year or one season, (most of which time he was occupied at Munn & Co's Patent Agency, New York city,) he has been actively engaged with us for 15 years. During the past ten years but few, if any, patent solicitors in this country have personally prepared as many applications for patents as himself. Mr. Strong's education as a civil engineer was supplemented by practical mechanical knowledge acquired at the bench and lathe in one of the foundries of this city, and afterwards as instructor on physics and engineering in a leading school of the early days of San Francisco, all of which has specially fitted him for his vocation. During the latter part of the past year he has, by a personal visit to Washington and other Eastern cities, become acquainted with the most approved methods of transacting the business, and the time spent in Washington was occupied in attending to the numerous applications we had at that time pending before the Patent Office, thereby making many pleasant personal acquaintances.

Recently Mr. Charles G. Yale (one of the editors of the MINING AND SCIENTIFIC PRESS for the past seven years) has taken a desk in our Patent Office to assist in more readily and promptly dispatching the business of that department. Mr. Yale is well known in this city, where he has resided since 1851, and is familiar with every part of the State. Since his connection with the MINING AND SCIENTIFIC PRESS, it has been part of his duty to keep track of all new appliances, devices, or processes which would be useful on this coast, and he has described in detail all the new machinery of any kind made at the city foundries, and the various new devices exhibited at our fairs or otherwise brought before the public. After leaving college he entered a laboratory for the purpose of further extending his chemical knowledge and more particularly turned his attention to chemical analysis of ores, assaying, etc. After being here a year, he spent two years in the mining regions of this State for the purpose of learning the practical details of mining, metallurgical operations and mining machinery, in which he is well posted, as he has since studied and written much on these subjects. For the past six years as Secretary of the California Academy of Sciences, he has also interested himself in keeping informed in the various fields of scientific research.

It is no egotism on the part of the firm to say that after so many years of a continuous course of patent soliciting, and scientific and mechanical publishing business, that there are but few of the best organized and practical offices in the United States so well and ably prepared to

intelligently secure full rights for inventors in general under the patent laws of the United States and foreign countries. For Pacific coast inventors we are more especially enabled to act with superior advantages. We have original copies and files of thousands of Pacific coast cases, which have passed through our hands, and a particularly full record and knowledge of all patents issued to inventors this side of the Rocky mountains. Many of these inventions are peculiar to the coast, more especially those in the field of mining, metallurgy and our remarkably progressive agriculture, and mechanical industry.

As editors and publishers of agricultural and mechanical and industrial journals we have access to, and have long been schooled by, important information which we constantly use for the benefit of applicants—information that could not be expected of ordinary patent agencies, with no other business connections.

We have in our offices the most complete sets of home and foreign patent-office records, patent law books, and scientific and mechanical newspapers, text books and works of reference in any private office outside of New York or Washington. These are all available to any of our clients or those in need of information.

We not only, on most reasonable terms, assist inventors in securing their patents, but take pleasure in furthering their interests at the most opportune time, by sending information of all their worthy inventions abroad through the world, through the columns of our standard industrial journals, the MINING AND SCIENTIFIC PRESS AND PACIFIC RURAL PRESS.

Many inventors have been greatly aided—to the extent of fortunes in some instances—by the illustration and publication of their patents in our papers. Becoming familiar with the special merits of an invention, in obtaining the patent, we are generally able to present them to the eyes of the public in more clear and forcible terms than ordinary newspaper writers.

WOODWARD'S GARDENS has the following new attractions: The buffalo chase; large whale skeleton; new museum; improvements in the zoological department, besides the other features which have made it popular.

MODEL MAKER AND MACHINIST.—J. A. Heald, No. 514 Commercial St., San Francisco, (fourth floor).

METALS.

[WHOLESALE.]

WEDNESDAY, M., March 6, 1878.

IRON.—		
American Pig, ton.....	28 00	@ 30 00
Scotch Pig, ton.....	28 00	@ 30 00
White Pig, ton.....	28 00	@ 30 00
Oregon Pig, ton.....	28 00	@ 30 00
Red Hot, ton.....	28 00	@ 30 00
Horse Shoes, keg.....	5 00	@ 5 00
Nail Rod.....	—	@ 7 75
Norway, Oval.....	—	@ 7 75
COPPER.—		
Sheathing, lb.....	34 00	@ 35 00
Sheathing, Yellow.....	21 00	@ 22 00
Sheathing, Old Yellow.....	12 00	@ 13 00
Composition Nails.....	24 00	@ 25 00
Composition Belts.....	24 00	@ 25 00
STEEL.—		
English Cast, lb.....	13 00	@ 14 00
Anderson & Woods, ordinary sizes.....	15 00	@ 16 00
Drill.....	15 00	@ 16 00
Flat Bar.....	14 00	@ 15 00
Plow Steel.....	34 00	@ 35 00
TIN PLATES.—		
10x14 1/2 Charcoal.....	7 50	@ 8 50
Enca Tin.....	23 00	@ 24 00
Australian.....	17 00	@ 17 75
ZINC.—		
By the Cask.....	9 00	@ 10 00
Sheet, 1x3 ft, 7 to 10 lb.....	10 00	@ 11 00
2x3 ft, 11 to 14 lb.....	11 00	@ 12 00
2x4 ft, 8 to 10 lb.....	11 00	@ 12 00
2x4 ft, 11 to 10 lb.....	11 00	@ 12 00
NAILS.—		
Assorted sizes.....	3 15	@ 3 25
QUICKSILVER.—		
By the lb.....	43 00	@ 45 00

LEATHER.

[WHOLESALE.]

WEDNESDAY M., March 6, 1878.

Seal Leather, heavy, lb.....	26 00	@ 29 00
Light.....	22 00	@ 24 00
Jodet, 8 Kil, doz.....	43 00	@ 50 00
11 to 15 Kil.....	40 00	@ 45 00
14 to 18 Kil.....	40 00	@ 45 00
Second Choice, 11 to 18 Kil.....	55 00	@ 60 00
Cornellian, 12 to 18 Kil.....	57 00	@ 60 00
Females, 12 to 18 Kil.....	53 00	@ 60 00
14 to 18 Kil.....	71 00	@ 75 00
Simon Ulmo, Females, 12 to 18 Kil.....	58 00	@ 62 00
14 to 18 Kil.....	66 00	@ 70 00
16 to 17 Kil.....	72 00	@ 74 00
Simon, 18 Kil.....	61 00	@ 65 00
20 Kil.....	55 00	@ 60 00
24 Kil.....	72 00	@ 74 00
Robert Calf, 7 and 9 Kil.....	35 00	@ 40 00
Kips, French, lb.....	1 00	@ 1 35
French Sheep, all colors.....	8 00	@ 15 00
French Sheep for Backs, lb.....	1 00	@ 1 25
Sheep Roans for Topping, all colors, doz.....	9 00	@ 13 00
For Linings.....	5 50	@ 6 05
Cal. Russian Sheep Linings.....	1 75	@ 2 50
Boot Legs, French Calf, pair.....	4 00	@ 4 75
Good French Calf.....	4 00	@ 4 75
Best Jodet Calf.....	5 00	@ 5 35
Leather, Harness, lb.....	35 00	@ 38 00
Fair Bridle, doz.....	48 00	@ 52 00
Skirting, lb.....	33 00	@ 37 00
Welt, doz.....	30 00	@ 35 00
Buff, doz.....	18 00	@ 20 00
Wax Side.....	17 00	@ 18 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, March 6, 3 P. M.
 LEAD TENDERS IN S. F., 11 A. M., 98 1/2 @ 99 1/2. SILVER, 24 @ 3. GOLD IN NEW YORK, 10 1/2. ON LONDON BANKERS, 43 1/2. GOLD BARS, 99 1/2 @ 99 1/2. SILVER BARS, 8 1/2 @ 9 cent. discount.
 EXCHANGE ON NEW YORK, 1 1/2; on London bankers, 43 1/2. Commercial, 50; Paris, five francs @ dollar; Mexican dollars, 80.
 GOLDEN CONSOLS 95 7/16; Bonds, 106 1/2.
 QUICKSILVER IN S. F., by the cask, 3 lb, 46 @ 47 1/2.

Signal Service Meteorological Report.

Week Ending March 5, 1878.

HIGHEST AND LOWEST BAROMETER.						
Feb. 27.	Feb. 28.	Mar. 1.	Mar. 2.	Mar. 3.	Mar. 4.	Mar. 5.
29.77	30.11	30.30	30.35	30.12	30.21	30.20
29.74	29.83	30.23	30.13	30.01	30.16	30.16
MINIMUM AND MAXIMUM THERMOMETER.						
50	55	59	63	58	55	61
47	45	49	50	50	46	51
MEAN DAILY HUMIDITY.						
77	71	77	74	85	74	77
PREVAILING WIND.						
SE	N	SE	N	SW	W	SW
WIND—MILES TRAVELED.						
296	134	114	103	138	1 00	150
STATE OF WEATHER.						
Fair.	Fair.	Fair.	Clear.	Cl'dy.	Cl'dy.	Cl'dy.
RAINFALL IN TWENTY-FOUR HOURS.						
.47	.19	—	—	.57	.03	—
Total rain during the season, from July 1, 1877, 30.09 in.						

ANNOUNCEMENT.

SAN FRANCISCO, JANUARY 1st, 1878.
 We beg to inform you that on the 12th, of the present month, Mr. Solon H. Williams, will be admitted as Junior Partner in our firm. The style and title of the new firm will then be Spaulding, Harris & Co.
 Mr. W. has been connected with our establishment for several years past, and in introducing him, we trust that he will receive your confidence and respect.
 In the future, as in the past, we will endeavor to give satisfaction to all those who favor us with their orders; and, as we have just added a large assortment of the latest and most beautiful founts of type to our already large stock, we are prepared to do any and all kinds of plain and fancy job and book work at low prices.
 Soliciting a continuance of your favors, we are, yours respectfully,
 SPAULDING & BARTO.

JOHN VALLEY, Cal., January 20, 1878.
 MESSRS. DEWEY & CO.—Gentlemen:—I received my patent last night, and was glad to find that you were so prompt in the matter. I am pleased to give you the credit due you for the faithful and honorable manner in which you have discharged your duty in getting my patent. I shall hereafter recommend you to the public as having discharged your duty with honor. Yours, etc.,
 W. W. CARLILE.

Information Wanted.—Any information as to the whereabouts of Mr. John Denohue, who left Ireland for Idaho City, in April, 1870, will be thankfully received by a friend that is inquiring for him. Address P. O. Box 2361, San Francisco, Cal.

To Mining Secretaries.

An amendment to Section 330 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:
 "The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where he principal office of the Corporation is situated."
 The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.
 DEWEY & CO., Publishers.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Catacart and Wide West Hydraulic Gravel

Mining Company.—Principal place of business, San Francisco, California. Location of works, Echo Mining District, Calaveras County, California.
 Notice is hereby given that at a meeting of the Board of Directors, held on the fifth day of March, 1878, an assessment of fifty cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company in the rooms of Doctor Floto, 402 Kearney Street, San Francisco, Cal.
 Any stock upon which this assessment shall remain unpaid on the eighth day of April, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the twenty-ninth day of April, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
 JOHN HOWARD OAREY, Secy.
 Office, (in rooms of Doctor Floto,) 402 Kearney Street, San Francisco.

Excelsior Silver Mining Company.—Prin-

cipal place of business, San Francisco, Cal. Location of works, Potrero District, Lincoln County, Nevada.
 Notice is hereby given that at a meeting of the Board of Directors, held on the fifth day of March, 1878, an assessment of fifty cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, 27 Market Street.
 Any stock upon which this assessment shall remain unpaid on the sixth day of April, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the twentieth day of April, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
 FRANCOIS P. DEVINE, Secy.
 Office, 27 Market Street, San Francisco, Cal.

Dolores Consolidated Mining Company.—

Location of principal place of business, San Francisco, California. Location of works, Wilson Mining District, Esmeralda County, Nevada.
 Notice is hereby given, that at a meeting of the Board of Directors, held on the twenty-fifth day of February 1878, an assessment (No. 3) of three cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, 418 California Street, San Francisco, California.
 Any stock upon which this assessment shall remain unpaid on the fifth day of April, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Thursday, the second day of May, A. D., 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors,
 J. V. CLARK, Secy.
 Office, Room 2, No. 418 California St., San Francisco, Cal.

Manzanita Consolidated Gravel Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Nevada County, California.
 Notice is hereby given, that at a meeting of the Directors, held on the nineteenth day of February, 1878, an assessment (No. 1) of twenty-five cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, Room 3, No. 215 Sansome Street, San Francisco, Cal.
 Any stock upon which this assessment shall remain unpaid on the twenty-fifth day of March, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the fifteenth day of April, 1878, to pay said delinquent assessment, together with costs of advertising and expenses of sale.
 THOS. J. OWENS, Secy.
 Office, Room 3, No. 215 Sansome Street, San Francisco, Cal.

Summit Mining Company.—Location of

principal place of business, San Francisco, California. Location of works, Mineral Point Mining District, Plumas County, California.
 Notice is hereby given, that at a meeting of the Directors, held on the tenth day of December, 1877, the several amounts set opposite the names of the respective shareholders, as follows:

Aul, Geo.	130	200	\$16 00
Aul, Mrs. Geo.	183	200 <td>10 00</td>	10 00
Boring, J. C.	82	1200	60 00
Brown, M. B.	45	200 <td>10 00</td>	10 00
Hallett, A. A.	121	500	25 00
Hallett, A. A.	122	500	25 00
Hallett, A. A.	123	500	25 00
Hallett, A. A.	124	500	25 00
Hallett, A. A.	125	500	25 00
Hallett, A. D.	115	1250	62 50
Hallett, A. D.	117	600	30 00
Hallett, A. D.	118	500	25 00
Hallett, A. D.	119	500	25 00
Hallett, A. D.	120	500	25 00
Hallett, A. D.	161	100	5 00
Hallett, A. D.	162	100	5 00
Hallett, A. D.	163	100	5 00
Hallett, A. D.	164	100	5 00
Hallett, A. D.	165	100	5 00
Hill, F.	37	200	10 00
Hallett, Joseph.	100	200	10 00
Hallett, Joseph.	107	200	10 00
Hallett, Joseph.	108	200	10 00
Hallett, Joseph.	109	200	10 00
Hallett, Joseph.	110	200	10 00
Hallett, Joseph.	111	200	10 00
Ingersoll, H. H.	53	500	25 00
Ingersoll, H. H.	54	500	25 00
Long, J. O.	61	200	10 00
Long, J. O.	62	200	10 00
Leonard, F. A.	40	500	25 00
Martin, A., Trustee.	26	200	10 00
Martin, A., Trustee.	81	200	10 00
Martin, A., Trustee.	82	200	10 00
Martin, A., Trustee.	98	100	5 00
Martin, A., Trustee.	99	100	5 00
Martin, A., Trustee.	102	100	5 00
Martin, Robert.	20	200	10 00
Quigley, Chas.	186	200	10 00
Oatman, J. E.	42	200	10 00
Oatman, E. F.	43	200	10 00
Peck, A. A., Trustee.	114	4000	200 00
Peck, E. A., Trustee.	9	1000	50 00
Peck, E. A., Trustee.	69	100	5 00
Peck, E. A., Trustee.	70	100	5 00
Peck, E. A., Trustee.	71	100	5 00
Peck, E. A., Trustee.	72	50	2 50
Peck, E. A., Trustee.	73	50	2 50
Peck, E. A., Trustee.	74	200	10 00
Peck, E. A., Trustee.	112	200	10 00
Peck, E. A., Trustee.	113	200	10 00
Peck, E. A., Trustee.	125	500	25 00
Peck, E. A., Trustee.	153	500	25 00
Peck, E. A., Trustee.	154	1000	50 00
Purkitt, J. H.	51	500	25 00
Peck, A. A., Trustee.	155	3000	150 00
Turrell, M. W.	47	200	10 00
Turner, J. W.	68	200	10 00
Turner, J. W.	64	200	10 00
Turner, J. W.	65	200	10 00
Whiting, F. R.	28	200	10 00

Iron and Machine Works.

THOS. PENDERGAST.

HENRY S. SMITH

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

OF ALL KINDS.

Fremont Street, Bet. Howard and Folsom,

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Risdon Iron and Locomotive Works

Corner Howard and Beale Streets,

Are prepared to make SHEET IRON AND ASPHALTUM PIPE, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material. Standard sizes of Railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

JOSEPH MOORE, Superintendent.

PHELPS MANUFACTURING COMPANY,

Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

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PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK. Repairing promptly attended to at the lowest possible terms.

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Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Bowers.

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Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

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All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

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V. KINGWELL.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

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THOMAS THOMPSON.

THORNTON THOMPSON.

THOMPSON BROTHERS, EUREKA FOUNDRY, 129 and 131 Beale St., between Mission and Howard, S. F.

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IMPROVED PORTABLE

Hoisting Engines,

For Mining and Other Purposes.

Steam Engines and all Kinds of Mill and Mining Machinery.

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MANUFACTURERS OF

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ROLLED BEAMS, ANGLE, CHANNEL AND T IRON, BRIDGE AND MACHINE BOLTS, LAG SCREWS, NUTS, WASHERS, ETC., STEAMBOAT SHAFTS, CRANKS, PISTONS, CONNECTING RODS, ETC., ETC.

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And General Machinists.

-THE-

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It is not surpassed by any dining house in the city. The saloon is new, commodious, elegant and comfortable, and all visitors to San Francisco, who wish good food well prepared and properly presented, at reasonable prices, should try the "Palace." Being new, it is fitted up with the latest and best approved cooking apparatus and other conveniences for patrons.

Tip-top Dinners, 50 Cents,

Are given from 5 to 8 o'clock P. M. It will pay yourself (and friends, too,) to go considerably out of your way to visit and patronize this first-class restaurant.

ERNEST SCHNUTENHAUS,

J. V. WEBSTER,

Proprietors.

Diamond Drill Co.

The undersigned, owners of LESCHOT'S PATENT for DIAMOND POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING AND TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

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To Ship and Engine Builders, Steamship Companies, Etc.

A Mechanical Engineer, having an extensive experience in Marine Engineering (especially compound) and Iron Ship Building, also in Steam Engines and Machinery in general, is open for engagement. First-class references. Address and references can be obtained at office of Scientific Press.



Among the advantages gained by this holder are the following:

It can be opened and closed quickly. The points are less obstructed while the articles to be filed are being placed.

The papers (wholly or partly folded) can be either "straddled" over the lower bar, or filed in regular book order.

The elastic hinge and band accommodate and hold firm either a large or small number of papers.

With less material, it is lighter and less cumbersome than other holders, and approaches nearer to bookbinding.

It has no rigid hooks, hinges or loose parts to break or get lost. It has proved durable in practice. The file is adjusted but 52 times a year for a weekly paper, and a sample holder can be opened and closed 1,000 times without showing wear.

Five sizes are made to suit the dimensions of different papers, viz.: 13, 22, 26, 30 and 34 inches, inside measure. Single samples will be mailed from office for 50 cents, (and upward, according to size), postpaid. Wholesale and retail agents wanted.

Smelter and Refiner.

A competent person is desirous of receiving the position of Superintendent of a Smelting and Refining Works. Can give satisfactory reference for ability to smelt all lead ores, refine silver and make market lead. No objections to go to the Territories. Address P. F. M., this office.

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Established 1856.

We have just added a large amount of new machinery of the latest and most improved kind, and are again prepared to fill orders for Rope of any special lengths and sizes. Constantly on hand a large stock of Manila Rope, all sizes; Tarred Manila Rope; Hay Rope; Whale Line, etc., etc.

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G MAHE, Director,

Machinery.

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(Room 10.)

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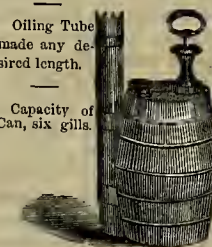
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NEAT AND SAVES TIME AND OIL.

Oiling Tube made any desired length.

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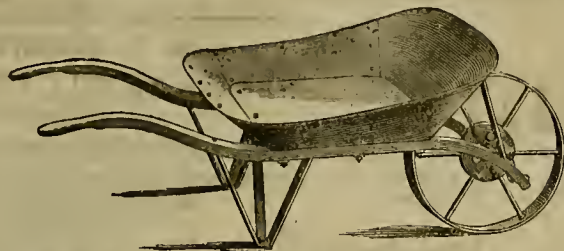
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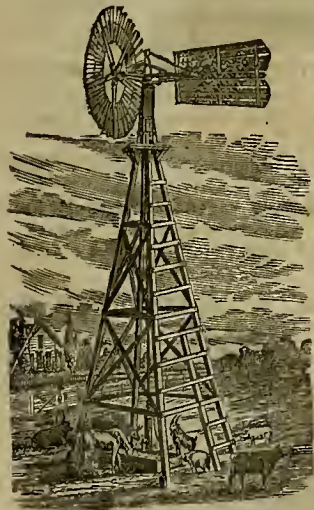
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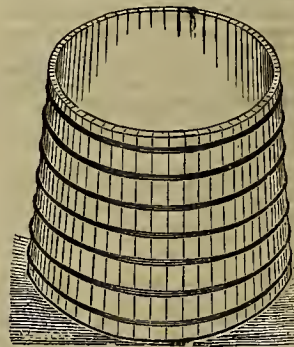
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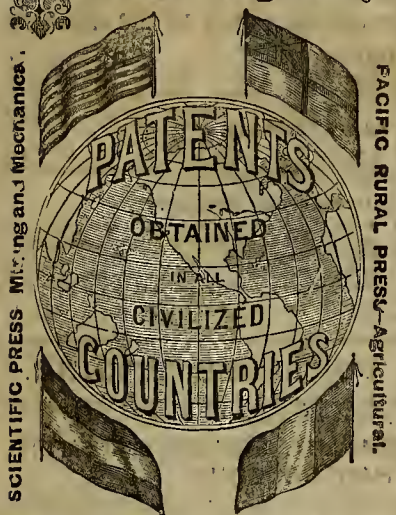
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VOLUME XXXVI.
Number 11.

The Pacific Coast in the Paris Exposition.

While our Pacific States and Territories will hardly be able to make such a showing as their merits deserve, it is gratifying to know that they will not be wholly without representation in the world's great industrial tournament. Owing to the niggardness of the Legislature and the apathy of our people, we ran a close chance of becoming conspicuous by our absence from this gathering of the nations, who would doubtless have felt a keen disappointment at not finding there any of the valuable products that have so distinguished this portion of the American Occident. It would have been awkward indeed for each of our citizens as might have visited the French capital had they found there nothing to officially represent the great natural wealth of the coast, and it is clearly the case that the well-earned reputation of our people for enterprise and State pride, would in that event have suffered some abatement in the estimation of the outside world.

It is true we are not a manufacturing people, anxious to exhibit our wares and secure for them new markets abroad; nor is it, perhaps, our policy just now to incite a heavy European emigration this way. But there is one thing we want, and stand greatly in need of, and that is a large influx of foreign capital to assist us in developing our mineral and other forms of material wealth. Without this our growth cannot be rapid, nor our permanent prosperity assured; and certainly a better opportunity than is here presented for making this want intelligently known, and favorably impressing the capitalists of other lands with the variety and magnitude of these resources can never be hoped for.

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In looking over the collection of minerals at the rooms of the Executive Committee, we find that, while it is not so extensive as could be desired, it will still be varied and choice in character. Many of the specimens are very fine, some exceedingly rare, a few being entirely new to science. Besides gold and silver-bearing ores, the collection embraces samples of the useful metals and the various minerals of economic value found on this coast. Every piece has a number attached to it, and in the printed catalogue, opposite the corresponding number, is a full description of the specimen, the common and scientific name being given, together with the locality where found, its mode of occurrence and sometimes the practical uses to which it may be applied, reference to authorities being always given. This catalogue will be translated into French and German. These specimens are carefully packed in strong iron-bound redwood boxes, about 18 inches square. For exhibition, they will be placed in jewellers' show-cases, low and supplied with the finest glass, so that they can be clearly seen. After the Exposition is over, they will be brought back to San Francisco, where such of them as are not reclaimed will be made the nucleus for a museum of economic geology. Many of these boxes are already filled and shipments will commence early in April. Parties having ores or other minerals for exhibition, should lose no time in forwarding them, as the whole must be dispatched for their destination by the first of May. About two tons of ore from the Bonanza mines have been boxed and are ready for forwarding, to be followed by samples of ore from other mines on the Comstock.

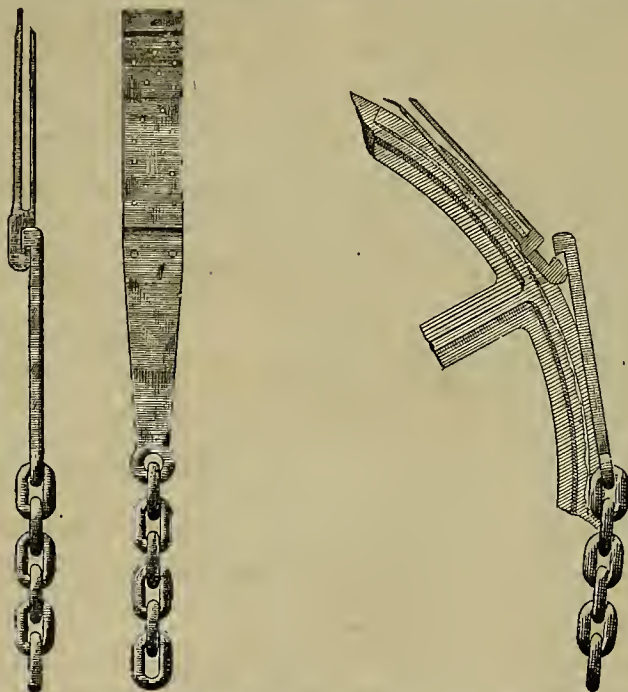
Mr. H. G. Hanks, one of the Commissioners for this coast to the Paris Exposition is preparing and has nearly completed a book descriptive of the region he represents, and which will be translated into French and German and be printed after he reaches Paris.

Cage Detachment for Mine Cables.

We give on this page engravings showing a method of detaching mining cables from cages automatically, to avoid accident from running the cage up into the sheave. The method is the idea of Mr. M. P. Boos, of Oakland, but there is no patent on it. In all deep mines, the cages run in guides in the shaft, and are hoisted and lowered by means of a wire cable made either flat or round, which passes over a sheave mounted on a frame over the shaft, one end being attached to the reel on the engine and the other to the cage. It very frequently happens that owing to inattention or carelessness on the part of the engineer, the cage is hoisted too high and is run up into the sheaves, when loss of life and property is the result. Many devices have been designed to overcome this liability of serious accident, some of them quite complicated,

shoulder of the socket for a fulcrum, with its long arm attached to the cage, so that it takes very little power to disengage it. The bevel in the socket and hook is made to correspond with the periphery of the pulley or sheave, so that the disengagement is easily effected. The engravings show the method of attaching a flat cable to the chain holding the cage; the means by which the cable may be joined to the bar with socket and hook, by inserting the flat cable in the slotted socket bar, and the way the hook is disengaged when drawn around the sheave.

The action of the device is like that of breaking a stick across the knee. As long as there is a direct strain lengthwise there is no danger of its breaking, but a transverse strain breaks it easily. The rivets used should be light enough to readily break by the strain when the bar is brought over the sheave. In lieu of the rivets a lug or pin may be used to prevent any sidr movement, but giving no resistance to proper detachment. Mr. Boos offers this suggestion to those who have recently been inquiring for a



DEVICE FOR PREVENTING OVERWINDING IN MINES.

and of such a nature as to require more attention than the engine itself.

Mr. Boos' suggestion is to form a bar which connects the cable with the chain attached to the cage, in a peculiar manner, so that as the straight bar is drawn over the pulley or sheave, in case the cage is hoisted too high, this bar will separate and the cage be held in place by the safety clutches, while the rope or cable may pass over the sheave without taking the cage with it.

This bar is formed in two pieces, having at one end a peculiar hook and at the other a slot or socket into which this hook engages. Light rivets are driven through both hook and socket, so as to prevent any liability of disengagement, except under certain circumstances. As long as the cage is held by the cable the bar will remain as one piece; but as soon as the cage is raised too high and the bar is drawn partly over the sheave, the bending action of the straight bar passing over the circular sheave will break the rivets and throw the hook out of the socket. The cage will then be held by the safety clutches which engage in the guides, and the cable is detached from the cage entirely. As will be noticed from the peculiar shape of the socket and hook that, although there is a bevel to the under side of the hook, where it engages with the socket, so as to hold it firmly in place, as soon as the bar attempts to go around the sheave, the bar with the hook becomes a lever, having the lower part of the

sure method of preventing overwinding, several accidents from this cause having happened of late.

PACIFIC COAST DIRECTORY.—We have received from the publisher, L. M. McKenney, a "Business Directory of Pacific States and Territories," for 1878. As the title indicates, it is a comprehensive index for business men in every large and small town on the Pacific coast, arranged under appropriate headings by State, county and town. Great care seems to have been taken to have everything alphabetically arranged, so as to be easy of reference. The alphabetical list of names serves as an index to the classified headings. Among other features is a classified list of the county officials of each county of the States and Territories.

BOILER INSPECTOR.—Some little opposition is being manifested by boiler makers and others to the appointment of a Boiler Inspector under the proposed bill now pending in Sacramento. The bill provides that the Governor shall appoint a Boiler Inspector for the City and County of San Francisco, where most of the boilers of the State are made. Steps are being taken by the boiler makers and others to defeat the final passage of the bill.

The new postoffice in Boston, has already cost the United States upwards of \$14,000,000 of specie.

A Pleasant Land to Live in.

There is not in the world a more beautiful land, nor one so well adapted to make pleasant homes, as the foothills of California. This magnificent region covers an area of more than 20,000 square miles, lying along the lower slopes of the Sierra Nevada and Coast Range mountains—the greater portion along the western declivity of the former. Among the more notable advantages of these foothills are an equable and healthful climate, pure water, plenty of timber, and a moderately good soil, which latter, while it produces under irrigation excellent crops of vegetables, as well as the grains and grasses, is capable of growing almost every kind of fruit with the fewest possible exactions and in the greatest perfection.

These districts are for the most part tolerably accessible, being generally not more than from 10 to 30 miles from steamboat or railroad transportation. A good deal of the land here is still a part of the public domain, and where taken up can, as a common thing, be bought at moderate prices. As the great gold-bearing belt of the State stretches centrally along nearly the whole length of these foothills, the cultivator of the soil finds in the mining towns and camps a good market for his products, the prices for which range higher generally than in San Francisco.

Now it seems to us that a good many of our unemployed and homeless people would do well to strive and get hold of a piece of land somewhere in the region mentioned. The main objects to be kept in view in selecting a spot for settlement are proximity to a local market, and in the absence of this, facilities for shipping to San Francisco. Water for irrigation is also a consideration of the first importance. As regards soil, wood, climate, etc., there is not much room for choice, this region of country being so much alike in these particulars that it matters little where one locates.

It is not to be supposed that a man, in repairing to these mountain slopes, will, with all their advantages, be able to live and get ahead, without hard work, careful management and economy. If poor at the start, he may even count on seeing some pretty hard times for a few years at first. The summers are hot, and at an altitude of 3,000 or 4,000 feet there is some snow in winter. But this is rather higher than the zone that offers best inducements for settlement, and along which little or no snow ever falls. Then, there is the drought to contend with, and this is really the most serious drawback to land culture in this part of the State. But ditches are being multiplied every year and no considerable district will, after a short time, be without water for irrigation. The soil here, though warm and quick, is not, except in a few alluvial bottoms, remarkably strong, and, to make it produce well, will require careful tillage, with all the manure at command for its enrichment. In short, the man who expects to raise good crops in the mountains, will have to see to it that the ground is well prepared and afterwards watered and that some additions are every year made to its strengthening and productive properties. While this is not much of a stock country, there is yet enough natural pasturage to enable the small farmer and fruit grower to keep a few cows and hogs, with the addition always of some sheep or goats if he desires it. Poultry invariably does well. As for health, these foothills are a perfect sanitarium. A more salubrious climate is nowhere to be found. The earlier settlers in this part of the State, being originally farmers, and coming, many of them, from the South and West, will be found a hospitable and obliging sort of people, disposed to receive newcomers kindly and assist them all they can. If the stranger seeking a home is, therefore, the right kind of a man, he will be able to obtain from these pioneers much useful advice and sometimes more substantial aid, if he requires it, all of which will make him feel at home and be otherwise of service to him.

SPECIE to the amount of \$413,000,000 is piled up in the vaults of the Bank of France, and the Bank of Germany holds \$119,000,000



CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

From Globe District, Arizona.

EDITORS PRESS:—We have several parties here at present representing California and Eastern capitalists. They are looking at mines and mills, and are talking of opening roads to admit of cheap transportation between them. I trust they will not, as in other cases I could refer to, find poorer ore and less of it than had been represented by the vendors of the mines they came to see. The most dangerous enemies that Arizona has to contend against at present are her pretended friends. They are millionaires in their own estimation, and when they go to San Francisco they fill California street with the sound of their "blowing." If the inventions of their brilliant imaginations were to make houses roofless, the roofs of some of the large hotels would have blown skyward months ago. When their ore assays \$200 per ton, it is placed at \$4,000; when their veins are two feet wide, they are represented as not less than 15 feet; when they have 300 tons of milling ore extracted, the quantity is put at 2,000 tons. Of course if they find parties willing to believe their immense "yarns," and experts are sent to report on their property, a condemnation is sure to follow; not because it is not good, but rather owing to the fact that it fails to come up to fabulous expectations, and is not regarded as worth the money asked for it. I have more than once exposed this unblushing and shortsighted mode of "operating," and have in consequence been branded in Territorial newspapers, by anonymous scribblers, as a traitor to this district and the agent of San Francisco "bears." The "traitors" are the untruthful men who "create" mines to suit themselves; who get local editors to print their exaggerations, and whose whole conduct make it evident that they regard mining and swindling as synonymous terms. There are few prominent hills in Globe district I have not been over, and I know enough of its mines to assert, with confidence, that the perambulating exptiators I am referring to, are only in reality trying to gild pure silver with their base, unburnished "brass." I shall expose the conduct of such persons whenever it becomes necessary to do so, and will not fear their hatred. My object is to make fair and candid statements about the celebrated mines of this district. If the truth respecting them is plainly told, it is enough, without exaggerations, to bring both capital and population here quite as fast as they can be properly assimilated. We do not want a White Pine speculators' excitement, to be followed by a partial collapse. We require capital for legitimate purposes, but have no use whatever for ignorant adventurers. We have several rattle-trap, rawhide mills standing idle now, which, were they in Virginia City, would be viewed by thousands of persons as curiosities in the production of silver.

We have one mine which has plenty of rich ore in its works, yet it was closed recently by an attachment for a petty debt. We have a good mine and a complete mill standing idle, with six helpless managers looking on, when a single competent Superintendent could make them productive with very little delay and expense.

How can a mine be made to pay when the miners, not having been paid for several months, do just as they please as to working it? This is the case with one of our productive lodes. There is a fine field here for the investment of capital, but judgment and skill must be displayed in selecting and working mines, otherwise failure is certain to be the result.

At the McMillan Mine.

I visited the Stonewall Jackson two weeks ago, and went through its principal works. It has, as many of your readers know, a lode of yellowish spar 70 to 100 feet wide, assaying in the mass only a few dollars per ton, but showing at various points streaks of good ore extending diagonally from the west to the east wall. The "spur," which yields the native silver slabs now being extracted, runs out from the main lode and has been followed nearly parallel to it for over 200 feet. It is in the east "country" rock some ten feet distant from what is now the foot-wall of the vein. This "feeder" is two to four inches wide and has spikes and projecting points of bright silver all through the rich dark brown spar which serves as its matrix. A fair proportion of this streak gives as high as \$12,000 per ton, and \$6,000 was taken out in one day recently. As it is likely to unite with the large lead when depth is attained, and there is a probability of great bodies of milling ore being found, the future developments will be watched with much interest. W. J. F. Johnson, the intelligent manager of the property, is vigorously at work on the main ledge. I learn that in the cross-cut of the hundred-foot shaft he has opened near the north end of the claim, a heavy body of water has been tapped. I hope he will also find sulphuret ore there. I regard the wide ledge of the Stonewall Jackson as on a great permanent lode, which will yet rival the Comstock. It can be traced for many miles to the southwest. Sometimes it appears, as at the Imperial and Sherman mines, in several veins;

then still further southwest it is seen as two immense ledges, about 300 feet apart, with good average surface ore. The Imperial at this depth of 80 feet has three feet of ore which assays \$125, 11 feet of about half the value. This is not very rich, but mines of so large an average grade are not numerous in any country. I expect in less than two years to see a very high value set on our wide veins of \$75 ore, and of these I think the lode I am speaking of will occupy the chief place.

A Specimen Mill Superintendent.

An Arizona mill man does not need to know much, and it is easy to find one who perfectly fills the "know-nothing" bill. Recently in one of our mills two "pan men" were talking of their being short of quicksilver, and of having to retort a quantity of amalgam. The newly arrived Superintendent overheard the conversation, and seeing that there was some hindrance to the work by the lack of quicksilver, he felt that it was his place to say or do something. Fancy the concealed amusement of the amalgamators when he asked them how much of that metal it would be necessary to obtain before the amalgam on hand could be retorted.

Forfeited Mining Claims.

There are prospectors here who have held claims for two years by a system of relocating. If they make a record they or their friends are ready to step forward on the last day of the year and relocate the ground. If some other person comes a day ahead of them they regard themselves as greatly wronged by his action. The United States law is so explicit that it is surprising that any one should misinterpret it. If a person relocates a recorded claim, say one day before its time is out, the only thing which can render his relocation invalid is the advent of 25 men to do a full hundred dollars' worth of work on that very day. Beginning this work when the law cannot possibly be complied with within the required time will not dispossess a relocater. It is a mistake, therefore, to suppose that a claim cannot be relocated until after the last day of the year allowed to do the work in. There is an actual forfeiture before the year ends, and this can certainly be taken advantage of unless the work is fully performed within the stipulated time. J. D. E.

Globe City, A. T., Feb. 27th, 1878.

Black Hills Mineral Districts.

EDITORS PRESS:—The mineral bearing section of the Black Hills which has been discovered and developed up to the present time, is divided into nine districts, viz: Whitewood, Garden, Ida Gray, Bear Buttes, Bear Gulch, Germania, Grand View, Rockerville and Rapid Creek, which embrace an area of about 60 miles square, and in all of which, except Bear Buttes, gold-bearing quartz has been discovered, and in Bear Buttes there are valuable silver lodes. The Whitewood district, which includes Deadwood, Whitewood, Hidden Treasure, Sheeptail, Bobtail, Gold Run, Blacktail, Sawpit and Poor-man's gulches, is the most extensive of all these districts, as well as the most thoroughly developed, both as regards the placer diggings and quartz leads. Some of the leading quartz mines in this district are

The Father de Smet,

In Deadwood gulch, discovered in the spring of 1876. This, which was the first quartz discovery in the Hills, shows a vein of paying ore from 30 to 40 feet wide. Ore from this mine was crushed in the fall of the same year by means of an arrastra, the first piece of machinery erected in the Hills, the yield averaging about \$15 to the ton and often much higher. Last summer a 20-stamp mill was built close to the mine, which has been running on the ore since. A short time since California capitalists purchased this mine, together with the Golden Gate, Justice and Belcher, located on the same hill, at a total cost of \$400,000. This company is now working about 100 men, and have 75 stamps crushing ore from the Father de Smet alone.

Sir Rhoderick Dhu, in Sawpit gulch, was discovered in 1876, but it failed to prospect richly until last summer, when the pay streak was struck, showing a vein of ore about 20 feet wide of a high grade, and creating quite an excitement. Cunningham & Dorrington purchased the mine soon after, and have since been prospecting it extensively and crushing ore. The exact yield is not known, but an offer by Californian experts of \$200,000 was lately refused.

The Hidden Treasure,

In Hidden Treasure gulch, was discovered in 1876, and shows a deposit of paying ore about 10 feet wide. Ore was crushed from this mine as early as the winter of 1876 and 1877 by the Ball pulverizing process, which has now given place to a 20-stamp mill, erected last spring. During the past year, this mine has yielded \$100,000.

The Keets, also in Hidden Treasure gulch, was discovered in 1876. This shows a deposit of paying ore about equal in extent to that of the Hidden Treasure. The Keets has gained more notoriety than any other mine in the Hills, because of the richness of the ore and the litigation between it and the Aurora, which has already indirectly caused the killing of one of the owners of the Aurora—Cephus Tuttle. It has been more fully developed, and more extensively worked, than any mine in the Hills, 50

stamps having been constantly employed crushing the ore for some months past. The yield has been large, often as high as \$35 to the ton.

Alpha,

In Deadwood gulch, was among the earliest discoveries, and the first mine in the Hills from which ore was crushed in a stamp mill. This lode shows a deposit of good paying ore from 12 to 15 feet wide.

The Woolley and the Pecacho, in Deadwood gulch, discovered in 1876, contains a stratum of ore from 10 to 12 feet wide, which has paid well. These consolidated mines are extensively developed, and a large quantity of ore has been crushed, with encouraging results.

Golden Terra, in Deadwood gulch, was discovered in 1876, and shows a deposit of paying ore 30 feet in width. The first ore was crushed from this mine last fall, and paid an average of \$16 a ton. Californian capitalists purchased lately an interest in this mine, the actual consideration not being known. The company are employing 50 men, and are crushing large quantities of ore daily.

Fairview, in Hidden Treasure gulch, an early discovery, shows a deposit of paying ore from four to 10 feet wide. No ore was crushed from this mine until last fall when the owners erected a 20-stamp mill, and have received a rich yield already. Reno, in Deadwood gulch, a deposit of paying ore about eight feet wide, discovered last year, yields very richly and shows large quantities of free gold.

The Golden Gate, Belcher, Justice, Aurora, Caledonia, Queen of the Hills, Rose, Sam, Chief of the Hills, Gustin and Gustin Extension, from which no ore has been crushed except for tests, show valuable mines and deposits.

In Garden district the following are some of the most prominent mines, of which the

Homestake

Is undoubtedly the chief. This mine is in Gold Run gulch, and was discovered in the spring of 1876. It shows a vein of paying ore the width of which has never been ascertained. A Californian company purchased 1,125 feet of this mine a short time ago; since then no ore has been worked, the company being engaged in making extensive preparations to work the mine. Former workings have yielded about \$20 per ton. Homestake No. 2, in Gold Run gulch, shows a vein of paying ore, the width of which is unknown. The title to this mine is in litigation, consequently work on the mine has been hampered and delayed. Old Abe, in Gold Run gulch, shows a vein of paying ore, but the width is not known because it has never been crosscut. A Lake Superior company own 1,150 feet. This ore yields on an average \$14 per ton. Giant, in Gold Run gulch, lately purchased by the Homestake company, shows a vein of paying ore about 20 feet wide.

The Highland Chief, Clara No. 1, Clara No. 2, American Flag, Lincoln and Hoodbug, are all considered valuable, and show good veins of paying ore, but at present are not being worked for want of milling capacity. B.

Deadwood, D. T., Feb. 22d, 1878.

Recent Publications.

Roasting of Silver Ores and the Extraction of their Respective Metals without Quicksilver. By G. Kustel, M. E. San Francisco: Dewey & Co.; Salt Lake: James Dwyer. Cloth, \$3.

This is a treatise on the "leaching process" of reducing ores, which is being so successfully employed in Bingham and some of the southern mining districts of the Territory. This method of extracting precious minerals is yet in an imperfect state, but enough is known of it to justify the expectation that it will soon revolutionize ore reduction in the West, as it has already done in some of the Mexican States. The economy of the process over the older methods is its chief recommendation. The works required for leaching and subsequent expense are small compared with the costly buildings, machinery, etc., heretofore necessary. Besides, very low grade ores may be successfully worked at a profit. Prof. Kustel divides his treatise in four parts. Under the head of introduction he treats of the classification of ores, explaining the difference between the real silver ores and argentiferous ores, the combination of minerals, means of desulphurization, chlorination, etc. A large portion of the work is devoted to the roasting of ores. This is made necessary by the difference in quality, as to richness, the presence of different minerals in the ores of the same general character, etc. The preparation of the ore for the leach is a most important part of the process, and as the ores differ materially in the minutiae if not in their general character, no rule can be given that will be applicable to all. He classifies, as near as may be, and gives directions and instructions, for preparing the grades. The third subdivision is of the leaching process proper, for silver, and the fourth for gold.

The book is appropriately illustrated, and the terms employed are sufficiently plain to be understood by those persons not scientific. Leaching is receiving so much attention in this Territory at present that Prof. Kustel's book promises to become as popular as it is useful.—Salt Lake Herald.

DIVIDENDS were paid by local incorporations, in February, aggregating \$2,838,700, against \$1,519,300 in the same month last year. The mining dividends last month amounted to \$2,645,700, while in February, 1877, they were only \$1,240,000.

The Growth of San Francisco.

A great number of interesting items concerning the city of San Francisco may be gleaned by a perusal of Langley's directory for 1878; everything, in fact, concerning the history of this city for the past year, as to its commerce, real estate, improvements, population, etc., being given. From it we extract the following figures and facts, which will be found of general interest: During the year there has been a notable decrease in the number of new buildings constructed, as compared with the preceding year, but the character of the improvements has been quite as good. The number of new buildings erected during this year is about 1,250. Of this number 42 are of brick. The aggregate value of these improvements is estimated at \$9,000,000. The number of buildings in the city is estimated at 28,100, of which 4,430 are of brick. The federal census of 1870 returns the aggregate number at 22,266. The returns of the Spring Valley water works for the year ending December 31st, 1877, show that 1,235 new taps were made, and it is estimated that the number of new buildings from which no new orders were received will more than counterbalance the orders from old ones.

During the year 1877 there were 3,085 sales of real estates, of the total value of \$18,549,991. In 1876 there were 3,840 sales, aggregating a total value of \$24,058,666; a reduction in the value of transfers of nearly \$5,500,000, the reduction in number of sales being 755. In the general character of sales made, the same tendency which marked the transactions of this year 1876 has been observed, namely: the purchase of small estates by persons of moderate means, for homestead purposes. The estimates of population are as follows:

White males over 21	99,750
White males under 21 (estimated)	58,500
White males under 21 (estimated)	58,688
White females under 18 (estimated)	51,587
White males, names refused, and foreigners not taken in the canvass (estimated)	2,750
Chinese, male and female	30,000
Colored, male and female	1,950

Total permanent population..... 303,215
To which should be added a large element of our population known as "floating," which consists of: 1st, transient boarders, etc., at hotels, boarding houses, etc. 2d, soldiers at fortifications in the harbor. 3d, persons engaged in navigating the bay, who claim this city as their residence. 4th, inmates of almshouse, hospitals, and other charitable institutions, county jail, etc. 5th, a large number of persons who have no permanent place of abode, together amounting to about..... 5,000

Total population, Feb. 1st, 1878..... 308,215

The estimate of the number of Chinese—30,000—of which 2,200 are women and 1,500 children—is based upon the judgment of reliable authorities who are familiar with that element of our population. Owing to local causes during the past year, this element in our population has decreased, it is estimated, 7%. The estimate for 1877 gave 32,000 against 30,000 this year. According to the United States census of 1877, there were 12,018 Chinese of all ages residing in the city, of whom it was estimated 7,000 were engaged in different departments of labor. At the present date reliable data give the number, including domestics, at 18,000, which, if correct, fully warrants the figure in the above table. The number of Chinese doing business in this city on their own account is 950, of which over 400 are engaged in the laundry business. About 200 establishments, of which one-half are owned by Chinese, are engaged in the manufacture of cigars. The number of Chinese employed therein is estimated at 4,000. The returns of the Six Chinese companies in San Francisco show that there are in the United States 155,000 Chinese, of which 60,000 are in the State of California.

The indications for 1878 promise to at least maintain the figures of the past year. The building associations have fully as much construction in progress, and the demand for residences is improving, sales in all cases being readily effected. The Western addition is still the more favored locality, the Mission addition ranking next.

The banks have still further reduced the rate of interest, money in large sums being now obtainable at 7%, and it is expected that the volume of money loaned on mortgages will fully equal that of the past year, which was the largest ever known to the city. This fact, in conjunction with the present cheapness of materials, must operate as a great stimulus upon the work of the coming year.

DURING the year 1877 the Central Pacific Railroad Company expended for the purchase of land \$1,260,691.90; for construction of road to date, \$133,884,291.33; for buildings, \$1,345,250.08; for engines, \$2,695,303.47; for cars, \$4,998,367.75. The amount received for transportation of mail, freight and passengers, during the year, is, in gold, \$11,144,154.87; in currency, \$5,833,081.47; current expenses, \$15,057,228.25. During the year two dividends of \$4 each, amounting altogether to \$4,342,040, were declared. The indebtedness of the company is \$93,057,769.37, and the amount due it is \$4,537,272.22.

It is officially stated that the New York Central and Hudson River Railroad Company's January earnings were \$800,000 more than in any previous month in the history of the company, and that the total earnings for the past four months aggregated \$10,000,000.

MECHANICAL PROGRESS.

The Evaporative Power of Locomotive Boilers.

This important mechanical subject was discussed recently by an English society of mechanical engineers. The effort was to set at rest certain widely diverging opinions which existed among practical men with reference to the evaporative efficiency of the various elements of a locomotive boiler, such as the area of the fire-grate compared with the total heating surface, the ratio between the tube surface and the fire-box surface and the rate of combustion per square foot of the fire-grate. The results of the discussion seem to be as follows: That no fixed rule could be established as the best for the relative proportions of the fire-grate, fire-box and tube surfaces; that length of tube had nothing to do with economic effect; that the diameter of the tube was also a matter of indifference; that economy of fuel did not depend upon the rate of firing; that when this quantity of fuel burnt was moderate, say 50 pounds or 60 pounds per square foot of grate per hour, the combustion was nearly perfect, while with hard firing there was considerable loss from carbonic oxides passing away unconsumed, and that a large increase of heating surface in proportion to coal burnt only slightly increased the economic effect, which, within the limits of practice in locomotive engines, was nearly in proportion to the fourth root of the heating surface.

In an Addendum the action of the blast-pipe was discussed. It was contended that, though a powerful agent in affecting rapid combustion, it was, *per se*, a very extravagant one; yet in general, in the case of locomotive engines, this extravagance was not chargeable to it, since there was a large quantity of steam which was available and would otherwise be wasted. A formula was given for calculating the power of a jet of steam, as an agent for creating a draft, based upon experiments made in 1851 and 1852. When applied to the blast-pipes of the locomotive, this showed that, on an average, the power required to force the air and gases through the fire-grate and tubes was only about 8 1/2% of the potential power of the steam escaping through the blast-pipe. In conclusion, it was pointed out that a large increase of effect would be obtained by subdividing the exhaust steam into a number of small jets instead of relying upon one large one, and that, under certain circumstances, this increase of power would be of great utility.

A SPECIAL CAR.—Mr. Johnson, a traveling musician, being in Garland, Colorado, and anxious to depart, manufactured a velocipede, with which he proposed to travel into Texas. Having become possessed of two two-wheeled velocipedes, such as were in common use a few years ago, he proceeded to fasten them together to run on a railroad. Wooden axles were constructed so that the machine could be adapted to any gauge of track; a broader tread was placed on the wheels, to which were added flanges made of whisky barrel hoops; levers were fitted to give means for using the hands as well as the feet to gain motive power. The whole arrangement was given a coat of red paint, and it was placed on the track at Garland ready for service. The machine weighs about 40 pounds and is easily handled. The operator sits on a seat, resting across what the two seats of the old velocipedes. Johnson mounted his novel traveling apparatus at Garland, and proceeded without accident, traveling at the rate of 15 miles per hour. Altering the gauge of his car to suit that of the Atchison, Topeka & Santa Fe railroad, he started for the East. Johnson is an old railroad man, and always provides himself with a time-card, so that he can keep out of the way of the regular trains. His apparatus is so light that it can be moved from the rails in a moment.

THE COST OF RAILROADS.—In reply to an assertion by Mr. Huntington that the Pennsylvania railroad cost \$400,000 per mile, Mr. Thos. A. Scott stated before a Committee of Congress that this was simply untrue, and added: "If you will take up the report of that road for the last fiscal year, you will see that the cost was \$38,000,000 on 360 miles of road, or \$120,000 a mile, a very moderate cost for one of the best constructed and equipped roads (having a double track and steel rails) in the United States, if not in the world." The cheapness of railroad construction in these hard times is very clearly shown by the fact that the Chicago & Alton Company, which is not one that will put up with anything less than a first-class structure, has let a contract for the extension of its Missouri line to Kansas City at the rate of \$15,000 per mile, excepting the bridge over the Missouri, the bridges to be iron and the rails steel. As the company can get money at about 6%, it will only need to make about \$1,000 a year net earnings to pay interest on this cost.

MANUFACTURERS' RAILWAYS.—Krupp's vast cannon and rail manufacturing establishment in Germany, says the *Railway Age*, illustrates the adaptability of the steam road to private industrial uses, as it contains over 37 miles of railway, with 24 locomotives and 700 cars. Of stationary engines and boilers there are no less than 298, representing 25,000 horse power.

An English Improvement in Blasting Cartridges.

We read that improvements devised by Englishmen have for their object the affording of greater security, ease and facility than heretofore in manipulating, transporting, and storing cartridges, and consist in making cartridges filled or to be filled with gunpowder or other equivalent explosive matter, in the ordinary manufactured state or in any state of manufacture, hollow, with an inner tube or tubes passing through them, and by means of such tubular or hollow space or spaces, passing one or more fuses through such cartridges; and also, when it is required to increase the charge afforded by one such loaded cartridge, stringing two or more of such cartridges together on the said fuse or fuses. Also in turning up, looping, or otherwise treating the fuse or fuses so introduced for the purpose of securing and firing the cartridge or cartridges strung thereon. The cartridge is to be made of any convenient material, tubular or any desired shape in section, and of an inner and outer tube or chamber arranged concentrically one within the other, or otherwise, and forming between them a hollow receptacle for the reception of the gunpowder or any other explosive equivalent; and the ends of such chamber or hollow receptacle are to be formed of or secured by annular disc or other shaped pieces, so secured to the walls of the hollow receptacles that when completed and charged the explosive material shall not fall out; or other convenient modes of securing the ends may be employed, but in all cases so arranged that the fuse or fuses pass easily, and so a hollow cartridge be formed ready for stringing on a fuse or fuses.

RETROGRESSION AT SHEFFIELD.—The *Ironmonger's Review* says: A few days ago one of the oldest scissors manufacturers in Sheffield, whose business lies chiefly with London houses, called upon a well-known firm in Bond street, and the principal informed him that they were going to exhibit at the Paris Exhibition, and they wanted him to make them a set of elaborately worked scissors, something that would show the progress that had been made of late years in this special branch of industry. "I couldn't do it," was the answer. "Oh! nonsense," said the gentleman of Bond street; "you remember those splendid goods you made us more than 20 years ago, and which we had at the Exhibition of 1851. Here they are;" and he produced from a drawer some of the most exquisitely beautiful scissors that had ever left a Sheffield workshop. The manufacturer looked upon them with almost paternal affection, and then said, "I could not make you such goods now if my life depended upon their production." The result of the interview was that these old scissors were brought back to Sheffield to be polished up, and they will do duty again in the Paris Exhibition; and we venture to predict that they will command no small amount of admiration.

PATENT NO. 200,000.—Among the patents leaving the Patent Office on a recent date, says the *Scientific American*, is one issued for a carbureter, which bears the number 200,000. This, however, is not the whole number of patents that have been issued, but only those granted since the reorganization of the office in 1836, as before that period the patents were not numbered. The whole number of patents issued from 1790 to the reorganization in 1836 numbered 11,340. By adding these to the No. 200,000 above referred to, we get 211,340 as the whole number of patents. The average number of patents issued yearly, up to and including 1836, was 247. The average since that time was 4,839.

MODIFICATIONS IN THE TELEPHONE.—Some modifications of the telephone have been brought to the notice of the Academy of Sciences, Paris, by M. Brignot. A plate of thin sheet iron having a black lead pencil pressing slightly on the center is connected by wires with the two ends of the bobbin wire of a Bell telephone. Instead of the magnetic bar, one of soft iron is used. In the circuit a battery of two laclanche elements is placed, and the plate vibrated by the voice causes vibrations in the black lead, and so in the resistance of the circuit and the intensity of the permanent current. Thus attractions and non-attractions are produced in the electro-magnet of the receiving end, and the sound of this voice is made audible.

HARDENING SMALL TOOLS.—It is said that the engravers and watchmakers of Germany harden their tools in sealing wax. The tool is heated to a whiteness and plunged into the wax, withdrawn after an instant and plunged in again, the process being repeated until the steel is too cold to enter the wax. The steel is said to become, after this process, almost as hard as the diamond, and when touched with a little oil or turpentine, the tools are excellent for engraving, and also for piercing the hardest metals.

TO DRY A SPIRAL.—M. Devrine proceeds as follows: In order to prevent bending, etc., which often occurs in drying a spiral between two rags or with a brush, he reduces a dry crust of bread to a very fine powder with a hammer, afterwards placing the powder in a small box, into which he transfers the spiral on removing it from the water or alcohol, and leaves it there two or three minutes; then, having well shaken the box, the spiral is taken out. It always comes out perfectly clean.

SCIENTIFIC PROGRESS.

The Use of Poisoned Arrows.

The sciences of ethnology is just passing through that vale of obscurity and opposition from which geology has triumphantly emerged. We are frequently called upon to answer various questions pertaining to the aboriginal races and tribes of the United States; their probable origin, manners, habits, customs and ceremonies, and for the furtherance of the object of adding light to the study and knowledge of this interesting study, we ask our readers for any reliable information regarding the following subject:

Primitive warfare was carried on chiefly by means of simple weapons, the most convenient, or that with which nearly every warrior was armed, being a bow and arrow. To intensify the effect of a fragile stone arrow-head, or to insure the destruction of the victim, poison of some kind or other was applied. In the East India islands, and many of the Pacific, the natives still carry on this barbarous practice. South America furnishes numerous tribes who are not behindhand, and in the United States we have tribes who are still known to occasionally use poisoned weapons. This custom is fast dying out, and has disappeared in most localities, but to retain what knowledge may be gathered regarding this peculiar and interesting custom, we ask for any reliable and trustworthy information from any sources from which it may be obtained.

For the purpose of getting a clear idea of this subject, we subjoin several questions to our readers. If a tribe use poisoned arrows or were ever known to employ them, please answer the following:

1. Name of tribe and the region occupied by them.
 2. Name of the materials employed in making the poison; mode of preparation; how applied to the arrow; and how transported while on the march.
 3. The color, consistence, appearance and effects of the poison.
 4. Is it used in warfare or the chase, or both?
 5. Is it still employed, if not, state when it was discontinued (approximately)?
- Any information to the above will be of great ethnological value, and due credit will be given to the informant.

COAL-TAR COLORS.—In a recent lecture, in London, Prof. Armstrong reverted to the proposed extensive production of coloring matters from coal tar, from which great things were prophesied some years ago. It was found that though aniline was yielded from coal tar in but small quantities, benzol was yielded plentifully, and that, by the addition of nitric acid to it, nitro-benzol was formed, and this, when submitted to the action of reducing agents, was converted into anilins. Thus a cheap and plentiful source of aniline from coal tar was some 20 years ago discovered. From this aniline we have dyes of violets, reds, yellow, green, blue and many newly-discovered shades. Since England has so large a supply of coal, it might have been expected that she would soon have been independent of the supply of animal and vegetable dyes from abroad and have been the greatest color-producing country in the world. This has, however, not been realized and England is gradually falling further and further behind Germany and France. The reason is given by Prof. Armstrong as follows: "Our manufacturers do not attempt to employ the co-operation of skilled chemists. If they were to seek them in England, they would not obtain them, as there are so few that have had the requisite training to conduct the work. We have in England no school where instruction is given in the particular kind of chemical work that is required." This result Prof. Armstrong attributed partly to the indifference of English Universities to the practical wants of the country.

THE TELEPHONE IN THE ARMY.—The German Military Department, always on the watch to make use of the latest scientific discoveries, has naturally devoted its attention at once to the telephone. In the last number of *Militair Wochenblatt* we notice a report on the practicability of its use in warfare for maintaining communication with pickets and outlying posts. The experiments were carried out at a temperature of 3° C., and during a violent wind, and showed most conclusively its availability for the purposes in question. In this connection, we may mention that E. & F. N. Spon, of 446 Broome street, New York, have just published in pamphlet form, a lecture, recently delivered by Prof. Bell in England, on the telephone. The pamphlet is fully illustrated, and is an important addition to the literature of this winning instrument.

THE PRESIDENT AND THE SURVEYS.—A dispatch from Washington says that President Hayes, in company with Alhert Bierstadt, the artist, who is now visiting the Executive Mansion, spent a considerable portion of an afternoon at the Washington headquarters of the Hayden survey of the Territories, and evinced great interest in the exhibit made by the Professor and his assistants of the methods and results of the scientific work of the various expeditions.

Delicate Test for Gold.

Faraday's researches upon the nature of thin films of gold and other metals, and upon the size of finely divided particles of gold diffused through various liquids, are revisited by the *Scientist*: Availing himself of this well-known reducing power of phosphorus, he floated small particles of it upon the surface of weak solutions of chloride of gold. In the course of 24 hours he found that the surfaces of the liquids were covered with films of metallic gold, which were thicker near the pieces of phosphorus, possessing the full golden reflective power of this metal, but becoming so thin by gradations as to be scarcely perceptible. They acted as thin plates upon light, producing the concentric rings of colors round the phosphorus at their first formation, though their thickness then could scarcely be the 1-100th, perhaps not the 1-500th of a wave undulation of light. By treating very dilute solutions of gold with phosphorus, he obtained the metal diffused through the liquid in extremely fine particles, producing a beautiful ruby color. These particles, when in their finest state, often remain unchanged for months, and have all the appearance of solutions, but they never are such, containing in fact no dissolved but only diffused gold. The particles are rendered evident by gathering the rays of the sun, or a lamp, into a cone by a lens and sending the part of the cone near the focus into the fluid; the cone becomes visible, and though the illuminated particles cannot be distinguished, because of their minuteness, yet the light they reflect is golden in character and seen to be abundant in proportion to the quantity of gold present. Portions of gold, so diluted as to show no trace of gold by color or appearance, can have the presence of the diffused solid particles rendered evident by the sun in this way.

PRIZE FOR RESEARCHES CONCERNING OXYGEN.—The influence of the animal organism of breathing pure oxygen gas of density corresponding to ordinary atmospheric pressure, has not hitherto been adequately determined. The Royal Society of Gottingen, says *Nature*, therefore offer a prize for new researches on the subject, made both on homoithermal, and, as far as possible, on poikiloithermal animals. In these researches, while certain externally visible phenomena in the animal will have to be considered, special attention is desired to be given to the nature of the blood and the exchange of material (excretion of carbonic acid and nature of urine). The oxygen used should be carefully freed from all foreign matters apt to occur in manufacture, while a limited (and perhaps hardly avoidable) admixture of atmospheric nitrogen would not compromise the results. In the Mathematical class, the Gottingen society desires (and offers a prize for) new researches in the nature of the unpolarized light-ray, "fitted to bring the conceptions of natural light of any origin near (in definiteness) to those which theory connects with the various kinds of polarized light."

MINERAL OIL IN A LAVA OF MOUNT ETNA.—In the basaltic zone which reaches from the foot of Mount Etna, in a south-southeasterly direction, near the village of Paterna, there is a prehistoric doleritic lava, containing olivins, which surrounds the clay deposits of a mud volcano, and which has been examined by Sig. Orazio Silvestri. Under the microscope the lava shows an augitic principal mass with a quantity of olivine and many white transparent crystals of labradorite. The lava contains numerous round or irregular cavities which are coated with arragonite, and which are filled with mineral oil. This oil, of which there is about one per cent. by weight in the whole mass, was taken from one of the cavities at 24° C. At about 17° C. it begins to solidify, and is of yellowish green tint by transmitted light, while by reflected light it is opalescent and light green.

TEST FOR ALCOHOL.—A very sensitive reagent for alcohol, and one that is very simple in its mode of application, says the *English Mechanic*, has been found by M. Jacquemart. It is a solution of nitrate of mercury, obtained by treating the metal with a little nitric acid of average concentration. The action is vigorous and rapid. The mercury is brought in part to the minimum of oxidation, and if a little ammonia be added to the mixture after reaction, a dark precipitate is obtained, which is darker the more of alcohol there is in the product suspect. Methylic alcohols and similar liquids do not give a dark precipitate with ammonia.

ZINC IN ANALYTICAL CHEMISTRY.—At the recent meeting of the American Institute of Engineers, Dr. Thomas M. Drown read a brief paper on the employment of pulverized zinc in analytical chemistry, especially in iron analysis. He showed that by the very simple and direct zinc method results were obtained within one-tenth of one per cent., in quantitative determinations of iron in ores, of those reached with the hydrogen method.

ANEROID BAROMETERS.—For measuring heights not exceeding one-quarter mile above the sea by means of the aneroid, Admiral Fitzroy proposed the following method: Divide the difference between the reading at this upper and lower stations by 0.011; the quotient is the approximate height in feet.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

QUIET.—*Chronicle*, March 2: Mining operations are not progressing as satisfactorily as we would wish, but when the snow disappears and the roads are again in good order for heavy freighting, we look for a revival. Owing to the snow, teams for Silver Mountain have been able to get no further than the Exchequer mill.

NEW MINES.—We learn that the farmers about Woodfords are getting excited over new discoveries of silver-bearing quartz in the vicinity of Vollum's ranch.

THE TARSHISH.—The new owners of the Schenectady (Tarshish) mine have been expected to visit the mine at Monitor with a view to commence work, but the heavy storms which have made our roads almost impassable for freight teams will probably delay operations until spring is fairly opened. We believe that developments now being made in the Advance mine—which joins the Schenectady—will be an incentive to the new company to push work on their late purchase.

AMADOR.

MINING NOTES.—*Ledger*, March 9: The Bonanza mill and mine at Drytown are idle. The pipe conducting water across Dry creek for the Crown Point mill at Drytown, was carried away by the big flood. As soon as this break can be repaired the mill will resume operations. The Centennial mine near Plymouth is not turning out as well as was expected. John Davis has quit work on his quartz claim near Dry creek. The rock did not touch the paying standard. Davis is doing a little work on the old Seaton mine. A number of miners are working on the auriferous lands owned by the railroad company in Ione valley. The company gives permission to anyone to work, demanding \$2 per month from each miner for the privilege. The workers average from \$1.50 to \$2 per day, which, after paying for water, will leave about sufficient for grub.

RICH GRAVEL CLAIM.—Since the late heavy rains, a rich gravel deposit has been discovered on the ranch of David Fulcher, between Jackson and Sutter Creek. The find was made accidentally by the washing of a few pans of dirt by outside parties. Fulcher had a number of sluice boxes made, secured a water supply from the Amador canal, and started four or five men to work. The yield of the first day was about \$11, but as work advanced into the bank the yield became heavier, in some cases exceeding \$50 per day. For the last seven and a half days the yield was \$325, coarse gold, some of the pieces weighing nearly an ounce. The gravel is three feet through, but it is thought that the thickest and richest part of the deposit is yet to come. The channel is extensive, and will require years to exhaust.

CALAVERAS.

THE SAN ANDREAS GRAVEL CLAIM.—*Citizen*, March 8: Work is still progressing. The company is running drifts in hopes of striking the main channel, which was immensely rich in early days. They have found several small quantities of gravel on the ledge, which prospects well. We have no doubt if they keep on until they find the channel, they will be paid for their pains.

PROSPECTING.—Mr. Chapman has been in town the past week examining the mines in this vicinity. He has been mining in Arizona, and says that he dug the bottom out of one mine. There are a large number of good mines in this vicinity which only need developing to make them valuable.

MOSQUITO GULCH.—A correspondent of the *Citizen* says the mines here are looking pretty well. Forty tons of rock from the Banner mill \$52 per ton. The San Bruno has stopped sinking and is running levels. Will hear good news from that mine shortly. The Little Blue Jay is still running and is looking well.

ALTAVILLE.—The late severe storms have impeded mining here greatly, and money is very scarce. Dolan & Cogswell have a valuable claim, which they are fitting up to work by the hydraulic method.

POCKET VEINS.—I have taken some pains to notice the structure and peculiarities of the pocket veins in this vicinity, and it is a question in my mind as to whether this branch of mining is in its decline or its commencement. Most of the professional pocket hunters seem to hold to the former opinion. There is a general impression that pay is found only to a limited depth. I do not see, however, any valid reason why this class of veins should prove exceptional as compared with all others, and I venture the prediction that whenever they are explored to greater depths, in a more systematic manner, it will be found that their real value has never before been understood.

EL DORADO.

THE HALLOCK MINE.—*Mountain Democrat*, March 9: Hallock is pushing things right along at his mine in Big canyon. He has a good deal of dead work to do in the way of retimbering and straightening up his tunnel. Meantime enough quartz is being brought out to keep his 10-stamp mill running steadily. The mill is run by water power—an eight-foot hurdy-gurdy, or percussion wheel, under 275 feet pressure—the canyon furnishing all the water he needs. There are some half dozen leads in sight, covering a

width of nearly 50 feet, and some of them are rich; but, as they all seem to run toward the main east wall, he hopes, when he sinks on the lode, to find them concentrated in one good ledge. If his anticipations are verified, he will have one of the best mines in the State.

INYO.

A RICH STRIKE.—*Coso News*, March 9: A rich strike is reported to have been made in the Lucky Jim mine, just before shutting down. Some of the ore found contains native silver.

EMIGRANT BULLION.—The Emigrant mining company brought in, on Saturday, 70 pounds of silver bullion, valued at \$1,200, and yesterday brought in 131 pounds, valued at \$2,000. Total for the month, \$3,200. Mr. Taylor, the Superintendent, has had the elements to contend with, as well as have others in other parts of the State, the rains and snow causing slides on the steep hill leading down to the mill so as to require a great deal of hard labor to repair it and make it passable for ore teams. Except for that difficulty the output for February would have been much larger.

NEW COSO.—Thursday night last all work at the mines of this company was ordered to be stopped, the Superintendent turning over everything to Mr. Poulter, the clerk. The Board of Trustees assume the responsibility of fixing prices of labor at the furnaces of the company, relieving the late Superintendent, J. J. Williams, of all blame in the premises.

KEARSARGE.—Supt. Gray, of the Kearsarge, managed to get to town during the week, and reports work progressing in the tunnel as usual, though he cannot now get to it for the snow. By a careful estimate, he concludes that 15 feet of snow has fallen on a level at the Kearsarge mill this winter.

MONTHLY SHIPMENTS.—The bullion shipments, in consequence of severe storms that have damaged roads over which the ore must be hauled to the mill, are very light, amounting to only \$8,950. Eight thousand dollars of this amount was silver bullion from the Emigrant company, and \$950 gold bullion from Snow's canyon and arastras. Seventy pounds more of bullion, valued at \$1,200, turned out by the Emigrant mill, was brought in last Saturday, in consequence of the break in the railroad has not been shipped from here, and is not, therefore, included in the February shipments. We shall have larger amounts of fine bullion to report this month, besides some silver-lead bullion from furnaces.

NEVADA.

DEARWOOD.—*Transcript*, March 11: The lessees of this mine are encouraged over their prospects. A strong 20-inch ledge has been developed, and rock is being rapidly taken out which it is thought will average \$40 per ton.

THE EUREKA LAKE COMPANY.—The lakes belonging to this company are filling up very rapidly. Enough snow has fallen in the mountains to insure a plentiful supply of water during the entire year.

PLANET.—The contract for running 800 feet of tunnel into this ground, near Lowell Hill has been completed. The company will continue the tunnel about 200 feet further by day's labor. The ground is easily worked and rapid progress will be made. The promise for a good paying mine is regarded as certain. The American mining company are washing at present in very rich ground. They have plenty of water, and employ white labor entirely.

PLACER.

THE CENTRAL MINE.—*Dutch Flat Forum*, March 7: This mine, owned by the Cedar Creek company, cleaned up last week \$6,000 for 26 days' run, with an average force of eight men. The dirt washed is about midway between the surface and bedrock, and was not expected to return any such results. As the bedrock stratum is known to be much richer than the dirt washed last week, such a handsome clean-up is a source of congratulation to the company, and of satisfaction to our people. Water is now plentiful all over the county, and the hydraulic mines are everywhere washing with good results.

SHASTA.

AT COPPER CITY.—*Reading Independent*, March 7: The mines at this locality are being worked, but they have not been able to do much on account of the very severe winter. The Extra mining company have struck some very rich ore, and have already ordered a mill. Mr. Potter, who has charge of the Bully Hill mine had to give up work until the weather settled, he has some very rich ore. The Northern Light, are working four men and are driving their tunnel in the hill very fast. They have some rich ore in sight and are so well satisfied with the prospects that they have made arrangements to put up a mill this summer. The placer miners have a good winter and Burgoen, Green, Powell and others have taken out a lot of gold, but they will not make a general clean-up until the water gives out in the spring.

SIERRA.

PAY.—*Mountain Messenger*, March 9: The Iowa company have been taking out pay for some little time, the ground already opened having got dry enough to work. The gravel is rich, and that the mine will be a success is now beyond question.

WATER.—The miners at Eureka had some water several days ago, and were busily at work opening their ditches.

THE BRUSH CREEK LEDGE is now from eight to ten feet wide and rich. One of the stockholders asks \$60,000 for his interest.

ORIENTAL MINE.—Work is progressing on

the Oriental quartz mine at Alleghany. A force of men is busy repairing works, shafts and tunnels. It is expected that the mill will be started early in the spring.

NEW PUMP.—The Plocene mining company has a new pump on the way. Supt. Thurston is pushing things with diligence, and the prospect is that a deposit of very rich gravel will be soon opened up in this claim.

TRINITY.

STORMS AND MINING.—*Journal*, March 9: The late storms, unprecedented in the weather annals of Trinity, will prove of immense benefit to the mining interest, for which the outlook was never better. It is estimated that the product of the gravel mines, which amounted, last year, to over \$1,000,000, will exceed that sum the present year.

TUOLUMNE.

THE GOLDEN ROCK MINES.—*Independent*, March 9: The gravel mines near Garrote are now in full operation. The Giants are at work against a 40-ft bank, each one using 700 inches of water, with a full supply. The gravel looks first-rate and big pay may be expected. Other mines along this range, equally as good, are yet undeveloped. When they are opened that section of country will add largely to the reputation of Tuolumne as one of the richest mineral sections of the State.

NEW ALBANY MINE.—The owners of the New Albany have contracted for sinking 300 feet deeper, at \$19 per foot. When completed, the mine will have attained a depth of about 800 feet, nearly perpendicular, the deepest, we believe, of any in the county.

THE TOM EVANS' MINE is turning out No. 1 rock. After sinking about 20 feet below the old works, a vein, of three and a half feet, has been struck, and every bucket that arrives to the surface is literally bespangled with gold.

GOOD ROCK.—*Union Democrat*, March 9: We were shown some excellent rock from London & Co.'s claim, up in the mountains, about 20 miles east of Sonora, a portion showing considerable gold, the rest rich sulphurated rock, running up to a high figure per ton. Messrs. London & Co. have also struck a graphite or plumbago lead of a very pure character. The latter is of considerable width, and, being thus pure, is one of the most valuable discoveries recently made.

Nevada.

WASHOE DISTRICT.

CALIFORNIA.—*Gold Hill News*, March 14: Daily yield, 650 tons of ore. One of the most important features of the week has been a continued development of the richest possible character of ore in west crosscut No. 6, near the northern boundary line on the 1750 level. This huge block of ore is proving itself second to nothing yet found in the mine. Large reserve blocks of ore are already developed on the 1650 and 1750 levels, enough to insure the present prosperity of the mine for many a month yet to come. During a portion of the week sinking on the C. & C. shaft was interrupted by the flood of water flowing from the Cou. Virginia mine; that has, however, exhausted its source, and the sinking is again being pushed forward with all the speed possible. On the north line the joint Ophir winze on the 1840 level is starting downward in good ore. On the 1950 level the east drift is still being advanced, the face in dry, hard blasting ground. The drift is now in a distance of 192 feet from the bottom of No. 3 winze. Some of the small mills off the line of the railroad have been stopped on account of the roads being so bad that hauling by team are sufficient to keep them going was almost an impossibility. This, however, will make no difference in the amount of bullion production for the month, as the Mexican mill has been procured and started up in their stead.

CON. VIRGINIA.—Daily yield, 600 tons of ore. The most important matter during the week in connection with the ore value of the mine, has been a steady extension on the 1650 level of a breast of ore three sets of timbers in width, southward, well down toward the Best & Belcher line. The strong flow of water recently struck above the 1500 level has been perfectly drained, the fountain being undoubtedly exhausted. The seepage, however, of the water down through the stopes, before it could be secured and carried off in boxes, slaked considerable portions of the vein, creating an intense heat in parts that has interfered some little with the work. On the 1650 level the south upraise designed to connect with the level above, for ventilation, is making the best of progress. The south drift on the 1850 level will probably complete a connection with the winze in crosscut No. 2, below the 1750 level and east of the ore vein to-day. When that is done the development of the east ore vein can be commenced in good earnest, and some valuable discoveries may be looked for.

OPHIR.—Important changes and developments have been and are on the point of being made in this mine. During the week, the east and west south lateral drifts on the 1900 levels have been connected and the needed ventilation obtained for the crosscutting and development of the ore vein in that portion of the mine. These lateral drifts each run in a southerly course and are at the southern boundary connection of the mine, distant about 480 feet from each other. This leaves a block of unprospected ground, nearly that width, extending from east crosscut No. 1 to the south line. From east lateral drift three crosscuts have been planned, to run westward and reach the east ore vein. The first of these, crosscut No. 2, is 87½ feet south of crosscut No. 1, in which

the ore was first found. This drift penetrated to the vein yesterday morning, cutting ore of the richest possible character. What the width and extent of this ore is cannot yet be determined, but the finding of ore so rich, 60 feet further south than anything heretofore developed on this level, adds much to the importance of the recent discovery. Crosscut No. 3 west has been started 67½ feet south of crosscut No. 2, and will in all probability reach the ore vein this evening or to-morrow. An upraise has also been started at the junction of the south lateral drift, east of the vein, and the crosscut on the south line, which will be connected with the winze from the 1700 level at the very earliest day possible. The east winze on this level, which is located east of the vein, about half way between crosscuts Nos. 2 and 3, was again started up, yesterday morning, and must strike the ore vein at no very distant day. On the north line, the east drift from the joint Mexican winze and the west drift from the north 1900 drift will be connected in a day or two more and the ventilation of the entire 1900 level be completed. On the 1800 level the east drift is also rapidly approaching the point where it is expected that the east ore vein will be found. On the 1700 level, the east winze, located at a point nearly 500 feet east of where the crosscut in which it is located was started, is now down eight feet, the bottom in \$50 ore. This winze will be connected with the 1900 upraise, now running to meet it, at the very earliest day possible. In the meantime, sinking the main incline is being pushed with all the vigor possible, to open up the 2000 level.

SIERRA NEVADA.—The north winze, below the 1200 and the upraise, from the 1450 level, has completed a connection and the needed ventilation obtained. A winze can now shortly be started below the 1450 to connect with the main drift on the 1700 level for a further prospecting and ventilation in that portion of the mine. Sinking the south incline winze below the 1800 level is being pushed ahead with all the vigor possible, the bottom still in very favorable working ground.

SAVAGE.—The pumps have reduced the water 80 feet below the 2000 level, at which point they have held it almost single handed while the large pumps of the Hale & Norcross were being lowered 50 feet below their 2000 station. This now being about completed, both pumps can resume work together, when it is confidently believed that the water will be rapidly drained.

CONSOLIDATED IMPERIAL.—The face of the north drift on the 2400 level is steadily advancing, the face in quartz and low grade ore.

YELLOW JACKET.—On the 2000 level the drift south from the south winze, toward the Crown Point mine is now in 121 feet. The repairs to the north winze being completed, sinking deeper below the 2200 level is actively being done, and a depth of 45 feet below that level is attained. The winze is to be continued through to the 2400 level. Good work continues to be done sinking the new shaft, bottom still in hard rock. Total depth to-day, 1,300 feet. The new machinery is being placed in position with all due energy.

BELCHER.—Sinking the north incline is making the best of progress, the bottom in good blasting ground. The east drift on the 2160 level is steadily advancing, the face still in the same favorable quartz formation as heretofore described. The east drift on the 2060 level is rapidly advancing, the face still in favorable vein matter. The 2260 foot station is being put in order for an advance of the drift at that point.

GOULD & CURRY.—The recent flood of water in the Consolidated Virginia, flowing partly into the Gould & Curry shaft, gave the pumps more than they could do for a day or two, resulting in a partial flooding of the drifts on the 1900 level. This was unfortunate, but was utterly unavoidable under the circumstances, and was, in fact, the best possible way to dispose of it for the time being.

JULIA CONSOLIDATED.—Sinking the main incline could hardly make better progress, six feet a day being about the average rate of speed. It is still following down the west clay wall of the ore vein, the upper side of the shaft cutting almost daily bunches of quartz of a fine character. It is the intention to open a new level as soon as the 2000 station is reached.

JUSTICE.—Daily yield 150 tons of ore, keeping the Pacific and Santiago mills steadily running. The ore stopes from the 1150 level upward to the 850 level are all looking splendidly, and are yielding good ore. The north and south drifts on the 1150 level are both still developing good ore as they advance.

OVERMAN.—Sinking the main shaft was making the usual fair rate of progress up to yesterday, when a blast unfortunately broke the suction column of the sinking pump, and sinking had to be suspended until a new suction could be inserted.

MEXICAN.—The joint east crosscut on the northern boundary line is steadily advancing through vein matter of no value. The face is perfectly dry. The air connection between the joint winze and west drift on the Ophir line, on the 1900 level, will be completed in a day or two more, when the entire mine will be once more in a splendid condition to commence the work of development on the lower levels.

BULLION.—The station timbers on the 1840 level are about ready to start up the east drift at that point. The face of this drift when stopped was in very favorable ground, with a slight flow of very hot water, and strong hopes are entertained that pay ore will be found when it is again started forward.

HALE & NORCROSS.—The air connection on the 2000 level with the Savage has greatly cooled and benefited the operations on the lower levels. The large lift pump has been lowered 50 feet below the 2000 level, and is now ready to do good service in draining the 2100 level.

CROWN POINT.—Sinking the winze below the 2000 level is advancing at the rate of six feet per day, the bottom in very favorable ground.

NORTH CON. VIRGINIA.—The pump station at the depth of 1,350 feet is about completed, ready to resume sinking the main shaft.

SILVER HILL.—On the 1800 level three drifts are being advanced, the two north and south drifts and the main east drift, all of which are in a fine healthy vein formation. On the 600 level the several crosscuts are being steadily advanced in favorable quartz and vein matter.

ALTA.—Sinking the main shaft is going steadily forward, the bottom still in hard blasting ground and the flow of water being quite strong.

LADY WASHINGTON.—The north drift from the Justice on the 1000 level is being driven ahead in the Lady Washington ground, the face still in ore and quartz of a fine, favorable character.

SUTRO TUNNEL.—The header is still in regular Comstock vein matter, with little or no water. The whole has to be timbered as advancement is made. Streaks of quartz giving low assays are occasionally passed through, and being now in Senator ground a good body of ore might be cut into almost any day. Total length of tunnel last evening, 19,186 feet.

SENATOR.—The Sutor tunnel, which is now passing through this mine, is prospecting it far better than could be done in any other way. When the most eligible point shall be arrived at the Senator Co. will drift both north and south from the tunnel and open out their mine in the most advantageous manner.

CALEDONIA.—The north drift on the 1600 level is being pushed vigorously forward, the face in very favorable vein matter. The drift on the 1400 level is also being pushed ahead, the face in quartz of a lively, healthy make.

CHOLLAR-POTOSI.—Almost the entire week has been spent in making repairs to this combination shaft timbers. This has now been completed and sinking resumed, with fair expectation that no further trouble will be met with. The shaft is now down 2,000 feet, or 360 feet below the Sutor tunnel level.

UNION CON.—The north drift on the 1600 level is being pushed forward with all the speed possible, following a heavy clay wall that has every appearance of being a separation from a quartz vein.

BEST & BELCHER.—Sinking the joint winze on the north line is making excellent progress, the bottom in soft vein porphyry, with slips of clay.

WARD.—Sinking the main shaft is being pushed downward with all possible energy, the bottom in good working ground.

NEW YORK.—Sinking the main shaft below the 1000 level is going steadily forward, the bottom still in vein matter of very favorable character.

UTAH.—Everything is working well, both above and below ground. On the 1350 level both the east crosscut and south lateral drift have made steady progress.

BELMONT DISTRICT.

EL DORADO SOUTH.—*Courier*, March 9: The Superintendent in his report of March 7th says: "During the past week we have run the 800-ft level 15 feet. The ground was quite hard and the work consequently slow. Yesterday we struck a vein of very rich ore in this drift of the same character as that on the 900-ft level. The ore strata increases as we proceed with the drift. The ore assays over \$1,000 per ton. We now have every assurance of opening up a large body of ore on this level. In the south drift from long winze we have a vein of ore three feet thick. The ore in this drift improves in size and richness daily. We now have more ore in sight than I have ever before seen in the mine. Machinery in good order."

GILA.—The vein, so far as explored, looks well. The chute is now down 63 feet, with a vein small but rich. As soon as connection is made with the crosscut, which will be in a few days, stopping will be commenced at this point. The stopes lately started in the south drift are producing a large quantity of very rich ore, some of which assays as much as \$5,387.84, and will average \$300 per ton.

CHERRY CREEK DISTRICT.

PROSPECTS.—*Independent*, March 4: There is a good chance that several of the mines here will be worked by foreign capital in the spring. Preparations are said to be in progress for beginning work on the Pacific mine. During the last week the Star company has shipped to San Francisco 11 bars of hullion, weighing 10,634 ounces, and valued at \$7,500. The pulp is now of a higher grade than it has ever been, and the mine itself is looking better than ever before.

OSCEOLA DISTRICT.

OSCEOLA.—*Reflex*, March 2: Dry gulch, at Osceola pans out better than any of the placers yet discovered out that way, and especially is that the case with the claim owned by Blair, Bradley & Co. For a number of days they have taken out on an average \$14.75 to the man. A number of nuggets have also been found worth in the neighborhood of \$20.

SCHILLBURN.—The mines about this old camp, long nearly deserted, are likely soon to be resurrected. The Randolph company, of New York, are about to begin work on their mine on Queen Spring hill, some two and a half

miles from the town. Another party, whose names we cannot at present give, are expected to begin work on another prospect.

ELY DISTRICT.

ALPS.—*Pioche Record*, March 2: A new stop of ore has been opened between the 7th and 8th levels, Mazepa mine, which promises well. Mill started up on this ore Thursday, and the ore is pulsing \$83.

MAYFLOWER.—During past week have been stopping out ore from the north drift, now in 140 feet. The crosscut of the north drift is showing very fine, having a body of ore about four feet wide, of a superior grade. The upraise to connect with the upper level will be finished this week and will give good ventilation to the mine. Have 100 tons of ore at the mill and 100 tons on dump awaiting shipment, as soon as the weather permits, having a contract with teamsters to haul 15 tons per day.

GREAT EASTERN.—In sinking the shaft have uncovered a very nice body of carbonate ore, averaging assays \$91. Will continue to sink a few feet further and then drift north. The indications are that the vein will open into a large body of ore.

CHRISTY BULLION.—The Christy mill and mining company shipped in hullion from Silver Reef, from February 11th to February 22d, \$10,092.38; on the 25th of February there was shipped \$2,960.11, making since February 11th \$11,052.49.

Arizona.

SILVER DISTRICT.—*Sentinel*, March 9: Assays of three lots of ore from the old mines discovered in Silver district, in this county, are as follows: Lead 73 per cent, and 79 ounces of silver; lead 75 per cent, and 28 ounces of silver; a carbonate ore, lead 58 per cent, and 110 ounces of silver. The proximity of these mines to the Colorado river, and the facilities offered for the transportation of ores greatly enhance their value. Several parties have lately gone in there well provided with tools and supplies. Bullion and ore shipments continue. The Mo-have brought down some 20 tons of Castle Dome lead, and 11 tons of gold quartz from the Buena Vista mine, which is sent to San Francisco for a working test of the rock. Also, sixteen bars of silver from Auhrey, valued at \$22,000. Six thousand dollars in hullion from the Hackberry was brought down by the Colorado. Eight thousand pounds of Silver King concentrations and a box of choice specimens for the Paris Exposition have arrived at Yuma.

BUENA VISTA ASSAYS.—A couple of weeks ago we gave some account of the Buena Vista, a gold mine about twenty miles from here, which was worked many years ago, and then abandoned. Ten tons of the rock are en route to San Francisco, to be subjected to a thorough working test. Average per ton of seven assays, \$125.82. The quantity of ore already exposed and ready for extraction is great enough to keep ten stamps busy for several years. The mine lies within a mile and a half of a steamboat landing on the Colorado river, and within twenty miles of the railroad bridge across this stream. It seems as if a mill should be put to work it, within the next six months or a year. The present owners are without capital, but are taking steps for securing it.

LYNX CREEK.—*Enterprise*, March 2: There are about thirty placer miners on the creek who will now make fair wages. Should water last for any length of time, the placer mines of Lynx, Hassayampa, Turkey, Big Bug and other creeks will turn out a good deal of gold. We know of several miners who have rich gravel ready for washing. Water is now running in every creek, gulch and ravine in this section, filling tanks and reservoirs in the valleys, and enabling our placer miners to "dig for gold" to good advantage. Quartz mills that had been idle, or running on half time, are now running regularly, crushing out the gold and silver.

TIPTOP MINE.—*Miner*, March 1: Things here are lively, mill running constantly, and work on the mine being pushed. The company have run over 1,000 feet of tunnel, and 400 feet of shaft, with every foot of it in a well-defined vein averaging 12 inches, that will mill not less than \$300 to the ton. With the 10 more stamps that will be added to the present mill, and the 20-stamp mill Mr. Hoffman contemplates erecting on the east side of the Agua Fria river, such a stream of hullion will flow into San Francisco as will completely obscure the bonanza mines of Nevada. The present mill cost \$55,000, and is very complete in all its appointments. Water is brought to it through a flume three miles long, that cost \$2,000. The road to convey ore from the mine to the mill cost nearly \$1,500. The mill will consume about 10 cords of wood per day, and crush 15 tons of ore. The contract price paid by the Tiptop company for work done at their mine is \$12 per foot, miners supplying their own light. There are at present 16 men employed at \$4 per day. A. Carpenter, M. B. Groat and J. M. Breat, owners of the Silver Palace mine, have sold to the Tiptop company 2,000 pounds of the ore from their mine for 60% of the assay. It will mill over \$1,000. The Tiptop company own five claims on the main vein, and one on the Foy.

PECK MATTERS.—George Hogle, Superintendent of the Peck mine and mill, came in on Sunday evening, bringing in \$3,600 in hullion. He reports the vein at the bottom of the 410 foot shaft still richer and larger than at any point above. They are still unable to run the mill more than 12 hours in 24, in consequence of a continued scarcity of water, notwithstanding the late storm.

News in Brief.

THE Papal expenditures are \$3,000,000 a year. LOS ANGELES wants a branch State prison. KINO HUMBERT is going to economize. He has sold off 1,000 of his father's horses.

JOHN MORGAN, saloon-keeper, committed suicide at Portland on Saturday.

THE population of France on the last day of 1877 was 36,905,788; of Paris, 2,410,349.

Two men at Fresno have a contract to shear 50,000 sheep in that county.

In South America the cities are lighted with castor oil.

EIGHTEEN HUNDRED revolutionary ladies have recently been flogged in Russia.

THREE members of the California Legislature have died since the beginning of the session.

GOLD dust at Deadwood, Black hills, passes current at \$17 per ounce.

MANY of the Chinese cigar makers in this city are said to be afflicted with leprosy.

CATTLE in Ventura county are dying from over-feeding on the rank growth of grass.

VICTOR EMANUEL's personal debts amount to \$7,000,000.

FORTY locomotives are about to be shipped from Philadelphia to Russia.

A BILL to appoint a milk inspector for the city of San Francisco has passed the Senate.

GOVERNOR BRADLEY, of Nevada, is a candidate for a third term.

The colored voters of Oakland have formed a political club.

THIS is the first winter in 17 years when there has been so little snow on the Blue mountains of eastern Oregon.

SIMON CAMERON and Montgomery Blair are now the only survivors of President Lincoln's original Cabinet.

THE rainfall at Nevada City amounts for the season to 40.46 inches, at Shasta to 70, and at Weaverville, Trinity county, to 53 inches.

THE California Street Cable railroad, one of the most substantial and well appointed ever built, goes into regular operation next Monday.

THE workmen of Humboldt county, Nev., will favor no man for a second term in a State office.

A BILL appropriating \$10,000 in aid of the sufferers by the flood has passed the California Legislature.

WINFIELD WESTLAKE, a native of Maine, 17 years of age, has been sent to the Insane Asylum. Eats nothing and tries to commit suicide.

THE people of California are to vote at their next general election upon the question of continuing or prohibiting Chinese immigration.

CIVIL suits are to be brought by the Government against several persons in Truckee, to recover the value of timber taken unlawfully.

It is estimated that 750,000 people have signed the temperance pledge in Illinois during the year 1877.

SAN FRANCISCO has a population of 308,215 against 301,020 last year, 30,000 of which are Chinese, and 2,000 colored.

TOTAL rainfall in San Francisco to date is 31.24 inches. Last year 10.59, and the year before, 29 inches.

THE Chinese have petitioned the Legislature to have their children, numbering, they say, 3,000, admitted to the public schools.

THE 20,000 acres of wheat in Los Angeles it is estimated will yield enough to give 20 bushels to every inhabitant in the county.

THE Janissaries of Light have opened a co-operative store on Howard street, adjoining their hall.

THERE is a Spanish woman living on the Little Colorado, Arizona, who claims to be 128 years old.

LAST week J. W. Sexsmith fell from the 1600 to the 1840 level of the California mine and was instantly killed. He left a wife and two children in Virginia City.

THE Utah Legislature says, polygamy is sustained by the Bible, is a divine ordinance; and they cannot legislate against religious belief and practices.

THE Australian government are considering the propriety of offering a \$20,000 bonus for reaping, cleaning and bagging wheat on the ground.

A LOS ANGELES farmer bought an acre of ground for \$50, sowed it with alfalfa last year, raised six crops of hay which, at \$10 per ton brought him \$120.

HENRY HALSEY SANFORD, aged 53 years, late County Surveyor of Yuba county, was found dead in his room last week, caused by an overdose of morphia taken to relieve rheumatic gout.

BERNARD ORDENSTEIN, one of the Fire Commissioners of this city has absconded, being a defaulter to the amount of \$4,700, lost, as is supposed, in stock operations.

THE receipts of the fair held lately for the benefit of the German hospital in this city, amounted to \$24,000, of which \$20,000 are clear profit.

THE *Ribbon Reporter* is the title of a new weekly journal published by Ada Hutchings, and designed to fill the special field created by the temperance agitation.

GOVERNOR IRWIN having declined to interfere in the case of George Butts, under sentence of death in Nevada county, he will probably have to suffer the extreme penalty of the law.

FRANK M. RICE, committed suicide at his home, near Halsey, Oregon, by shooting himself through the heart with a rifle. Deceased has been in poor health for some time, and became despondent. He was aged 40 years, and leaves a family.

THE best throw of dice.—Throw them away.

THE Sucker mining boats of Oroville have produced nothing but a big law suit.

YOUNG Finlaw, who was accidentally shot at Santa Rosa, on the 8th, died on the 11th.

ON Monday last a Miss Hyde, was struck and killed by a runaway horse in this city.

THE citizens of Salinas elected their whole municipal ticket, except one councilman, who was returned by the Workingmen.

AN old man, named Chris. Wermiller, was murdered recently in his house, near Vacaville, by unknown persons and the house robbed.

GOVERNOR IRWIN has signed the discharge papers of 29 prisoners whose terms at San Quentin expire next month. Nineteen of them are to be restored to citizenship.

DUNCAN is now charged with perjury, and with the embezzlement of 17,000 shares of stock of the Safe Deposit company, amounting to \$1,020,000.

ONE of the Sioux chiefs from Sitting Bull's camp told a scout on this side that the hand were nearly starving and would gladly surrender if they could keep their ponies.

THE coinage at the San Francisco Mint last month was the heaviest in any month of its history, aggregating \$7,085,000, the greatest in any previous month being \$6,878,000. Two hundred and seventy-eight thousand double eagles were coined.

RAINFALL this season to date has been, at Mariposa, 28 inches; at Dutch Flat, 43 inches; at Cherokee, Butte county, 52 inches; at Shasta, 70 inches; at Grass Valley, Nevada county, 46 inches.

AN incendiary fire destroyed the distillery of Sachman & Jacobs, at Santa Rosa last Sunday morning. Seventeen thousand gallons of wine and one pipe of brandy were destroyed. Loss, \$30,000, partly insured.

THE President of the State Geological Society has been instructed to make a selection from such specimens sent to the society as he may think desirable to aid in the Pacific coast mineral exhibit at the Paris exposition.

OLIVER SYMONDS while at work last week in the shaft of the Watt gravel mine, at Moore's Flat, was, as is supposed, seized with a fainting chill or fit and fell 170 feet, to the bottom of the shaft, mashing his head and shoulders to a jelly and killing him instantly.

GEORGE GREY, while under the influence of liquor, shot and dangerously wounded William Hunter, hookkeeper of the Con. Virginia mine, Sunday last; cause, unwarranted jealousy.

THE largest single contract ever taken in America from a foreign nation is the \$17,000,000 one given to the Providence Tool Company by the Turkish Government. The company now employ 2,500 men, who turn out 200,000 guns per year, or 600 finished guns per day.

WILLIAM INKHEEN, 33 years of age, was last week drowned by falling from a steamer at Washington street wharf in this city. His family reside in Bremer Haven, Germany, and were about to start for this city.

THE workmen of Reading, Shasta county, have organized and adopted a constitution and by-laws. The platform is anti-Chinese. They claim on their roll of membership a majority of the voters of that precinct.

THE body of George H. Anderson, a native of Ireland, and 40 years of age, was found in the water near the Presidio last week. He left his home some three weeks ago in a despondent mood, being out of work, and told a friend that he intended to commit suicide.

ON Tuesday night last a very large California lion entered a sheep corral in the Cannada Larga, and killed one of the band. Before he had time to make off with it, a Frenchman, by the name of A. Canet, killed the lion. The tail alone was over four feet in length.

EDWARD D. KNIGHT, long connected with the press of this city and Sacramento, died at his residence on Jessie street, last week. He was a man of ability in his profession and possessed of rare social qualifications.

AN election held in Oakland, on the 11th, inst, the Workingmen's party elected Andrus, Mayor; Clark, Police Judge; Byrne, District Attorney; Knob, Justice. In Sacramento on the 12th, the same party elected the Mayor and City Attorney.

YESTERDAY morning John Harrison, was stabbed and almost instantly killed by a young man named John Welsh, a painter by trade, at the corner of Tenth and Franklin streets, Oakland. They were related by marriage and a grudge existed between them. The stabbing was done in self defence.

THE crop prospects throughout California were never better. Even in the flooded districts, there will, with small exceptions, be a heavy yield. In the central and southern counties the crops will be enormous, much more land having been planted everywhere than ever before.

It is reported that Charles Langenberg, one of the boys employed on the training ship *Jamesstown*, committed suicide on last week by jumping overboard, in consequence of alleged ill-usage which he had received. Deceased was a native of Hanover, 14 years of age, and had been on the ship one year.

JULIA DONAHY, 40 years of age and a native of Ireland, has been committed to the Napa insane asylum. She imagines that she sees pictures on the wall, does not sleep, and requires restraint. She is violent at times, especially at night. Also Jules Bourdan, 22 years of age and a native of France. He imagines that he sees God in the clouds, and is noisy, cheerful and melancholy by turns.

Australian Opinions of the American Railway System.

The report of the Commissioners for Victoria to the American International Exhibition, says of American railroads: "The Americans are justly entitled to the highest rank in the mechanical arts and appliances. The simplest hint of a mechanical idea is, by their native ingenuity, perseverance and mechanical skill, worked out to proportions which any one who has not resided among them would scarcely conceive. Hence it is that the railroad system has been extended by means of the street tramway, one might almost say, to their very 'firesides.' The process of making adequately good roads for the interior traffic of their cities was much too tedious and slow for them. Whether time will not effect a change in this respect and whether their finest cities will, in the future, be given up to the street tramway and its car, or whether they will afford, by means of really good roads, an unimpeded traffic for all classes of vehicles, remains to be seen." This on the subject of railways:

"The Americans never tried to make a good common road, and the railway system was introduced at the nick of time, and was quickly and universally adopted. It is the West which owes most to railways, for in the Eastern States the rivers are open for seven months of every year, bringing cargo and passengers to the cities upon the coast. Communication between the North and South, between New York, Boston or Philadelphia and New York, was conducted by a combination of boats plying between rivers and inland seas, and stage coaches. In the East the railways have only added to the facilities for locomotion. It is scarcely too much to say that they have called the West into existence. Grain and heavy produce find their way from Chicago to the sea by a long and tedious lake, canal navigation during the summer months, but emigrants would scarcely have submitted to the inconveniences of a month's journey to reach a city which is brought by the express train to within 36 hours of New York or Philadelphia. The long, tedious and dangerous journey across the plains from St. Louis or Chicago to San Francisco, when compared with the facility with which the journey, if accomplished by the Union Pacific and Central Pacific railways, show the difficulties which would have attended the colonization of the Western prairies from the Atlantic seaboard if it had not been for the discoveries of Watt and Stephenson. But for the introduction of railways Omaha would be practically further from Liverpool than Melbourne actually is."

Exports of Petroleum

Six years ago our exports of crude and refined oil amounted to an aggregate of 90,000,000 gallons. This was in 1872. Three years later, the total had risen to 140,000,000 gallons. In 1877 the export was, in round numbers, 248,000,000 gallons. The increase in the yields of the Pennsylvania oil fields has kept pace with the demand abroad and at home—the average yield in 1870 having been about 13,000 barrels per day, while in 1877 it had risen to an average of more than 35,000 barrels daily. The growth of the trade in the foreign markets is a curious study. For example, the export to London in 1872 was 1,370,000 gallons, and in 1877 it was 16,000,000. Liverpool took 1,388,000 gallons in 1872, went up to 8,000,000 in 1874, and in 1877 bought 9,500,000 gallons. But these figures are entirely eclipsed by the statistics of our oil trade with Germany and the East. There were shipped to Bremen in 1877 more than 42,300,000 gallons of petroleum, against 11,800,000 in 1872 and 23,000,000 in 1876—an enormous increase, equal to about 100% in the past 12 months, and nearly 400% as compared with 1872. The shipments to the Dutch East Indies more than doubled in 1877 as compared with those of the previous years, and China and the East Indies took 10,000,000 gallons last year, against one-fifth that amount in 1876.—*American Manufacturer.*

HEATING A CITY BY STEAM.—The experiment of heating the city of Lockport, N. Y., by steam has proved highly successful. Three miles of pipe, properly covered with non-conducting material, laid underground through some principal streets, radiates from a central boiler house, and 50 different dwellings and other edifices, including one large public school building, have been thoroughly warmed all winter. Dwellings more than a mile distant from the steam generator are heated as readily as those next door. Steam meters are provided, so that each customer need pay only for what he consumes. It is claimed that the system can be so developed as to furnish steam at 50 pounds pressure transmitted through 20 miles of pipe, thus supplying power for engines and manufactories, and steam for cooking and laundry purposes, for extinguishing conflagrations, for clearing streets of ice or snow, or protecting hydrants from frost.

COTTON MANUFACTURE IN THE SOUTH.—Senator Gordon, of Georgia, says that seven cotton mills have been constructed in the South during the past year, and, as a rule, their machinery is of the latest and most advanced patterns, built with the certain knowledge that the south in manufactures must compete with the skill and experience of the East and England. He also says that the mills of the South have been generally successful, and the errors and want of experience of the past will doubtless be corrected in the future.

The Metric System in a Single Sentence.

"Measure all lengths in meters, all capacities in liters, all weights in grams, using decimal fractions only, and saying deci for tenth, centi for hundredth, milli for thousandth, deka for ten, hekto for hundred, kilo for thousand, and myria for ten thousand."

This sentence comprises the entire system, for surfaces and hulks are simply the squares and cubes of the measure of length, and the "ar" and "ster" are only other names for the square dekameter of land, and the cubic meter of firewood.

The meter (measure) is one ten millionth of the distance from the equator to the pole, and equals the distance from the tip of the fingers to the center of the opposite breast. Four steps equal three meters. The width of the hand is a decimeter; and of the fingers, two centimeters. The liter (capacity) is simply the cube of a decimeter (tenth measure) in the more convenient cylindrical form; and the gram (weight) is simply the weight of a cubic centimeter (hundredth measure) of water.

Definition of the Various Measures of Metric System.				
Meaning.	Spelling.	Pronunciation.	Illustration.	Abbreviation.
length	meter	meeter	like gas meter	m.
capacity	liter	leeter	as in pique	l.
weight	gram	gram	as in dram	g.
breadth	decimeter	deet	the decimal	d.
thickness	centimeter	cent	the cent	c.
ten thousandth	millimeter	mill	like mill	m.
ten hundredth	dekagram	deka	like dekalogue	dg.
hundred	hektogram	hekto	like hecatomb	hg.
thousand	kilogram	kilo	like kilobomb	kg.
ten thousand	myriagram	myria	like myriad	mg.
To these ten are sometimes added:				
surface	are	ar	area	a.
solidity	ster	ster	stereoscope	s.

The names *meter*, *liter* and *gram*, are from Greek words, understood in all modern languages to mean a *measure* (as a gas-meter, water-meter, etc.) a *capacity* and a *weight*. As the metric system is now used by most nations and will soon be universal, the names understood by all nations are used, instead of *measure*, *capacity* and *weight*, which would be understood only by the English. For the same reason the fractions are not called *tenth*, *hundredth* and *thousandth* in English, but by their Latin names, *deci*, *centi* and *milli*. The large quantities, instead of *ten*, *hundred* and *thousand*, are called *deka*, *hekto*, and *kilo* the Greek words for these numbers. These words are short, avoid all danger of confusion, are understood by all nations throughout the world, and so are very much to be preferred. We therefore say, not *hundredth measure*, but *centimeter*. Not *one thousand grams*, but *kilogram*, etc.

Each prefix is an independent word, accented on the first syllable, and retains this accent in the compound, centimeter, not centim'eter, etc. The abbreviation for the compound is simply the letters for the two parts, dm. for decimeter, Dm. (with capital) for dekameter. For shorter names of the compounds, pronounce only the prefix and the first letter of the unit, saying centim, millim, decil, hektog, etc. The system will be understood best by remembering that our system is really a part of the metric system. The dollar is *value*, as the meter is *length*, the liter is *capacity*, and as the gram is *weight*. A dekadollar we call an eagle, a decidollar a dime, and the centidollar and millidollar are shortened to cent and mill. Both the money and metric system correspond perfectly to our arithmetic.

There are no tables, or scales, or complicated relations. With the meter, every possible dimension (length, surface or solidity) can be measured; with the liter, every possible capacity; with the gram, every possible weight. The single sentence above takes the place of compound or denominate numbers in our arithmetics; and as a result large committees of our ablest teachers report that a full year may be saved in the school-life of every child. The gain in commerce is much larger, for a single multiplication or division gives an absolutely accurate result, where the common system requires several operations to get often only an approximate answer.

The metric system, by which so much is accomplished, has now been adopted by 28 different nations, including a majority of the civilized world. In 11 countries it is in exclusive use; and in several, like Germany and France, there are penalties for using any other measures.

This system is now being rapidly introduced into the United States, and within a few years will take the place of the present complicated tables, as dollars and cents have driven out the pounds, shillings and pence.

The educational society incorporated to secure this result desires the co-operation of every friend of economy and education, and will gladly send full information to applicants who address the American Metric Bureau, Boston.

Labor-Saving Machinery in Massachusetts.

A feature of the Massachusetts census of manufacturers of 1875, deserving special notice, is the showing made in regard to the effect of labor-saving machinery on the production of some of the leading staples. We find that, with 24,161 hands employed in 1865, there were produced 175,875,000 yards of goods, a ratio of 7,355 yards to each employee. In 1875 there were produced, 874,780,000 yards by 60,176 employees, or about 12,213 yards to each hand. This shows that with an increase of a little over 149% during the ten years in the number of hands employed, the quantity of cloth produced was increased nearly 392%. Woolen goods also make a very striking exhibit. For 1865 the production is placed at 46,008,141 yards, and the number of employees at 18,753. For 1875 the production is 90,208,280 yards, and 19,036 employees, showing an increase of 96% in production to 1% in the number of employees. The number of pairs of boots and shoes made in 1865 was 31,870,581, and number of employees 52,821, and in 1875, 59,762,866 pairs with 48,090 employees.

This is probably the most important showing made, the production during the ten years having been increased nearly 88%, while the force employed was less by 4,731. The product of carpetings in 1875 increased fourfold as compared with 1865, while the increase of force employed was less than half the amount. The average value of boots and shoes produced in 1845 was 70 cents per pair; in 1855, 80 cents; in 1865, \$1.80 and 1875, \$1.50. The value of carpetings was \$2 per yard in 1865, and less than 73 cents per yard in 1875—which shows the source of the immense supply of dollar carpetings. The great reduction in the number of employees in the clothing business shows to what an extent the sewing machine, the machine shear and more careful gradations of "ready-made" have superseded the need of the tailor and the needle woman.—*N. Y. Daily Bulletin.*

The Dutch in Holland.

The Department of State has received a report on the social and political condition of the Dutch, from the Minister of the United States to The Hague. As an illustration of the carefulness and steadiness of the Dutch, the Minister says that there has not been a bank failure in Holland during the last 40 years, and that the paper money of the banks during that time has been equal to gold. In regard to fire insurance companies, there is no such thing as a failure on record, and while the rate of insurance does not average more than half of one per cent, the companies are in the most flourishing condition, realizing 12% to 16% per annum. First class railroad travel is only one cent per mile, and yet the roads pay good dividends. Pilfering officials are scarcely ever heard of, and when they shock the nation by turning up, they are severely punished and forever disgraced. No free passes are granted, and managers and directors have no power to pass anybody over the roads free. All must pay the public rates. Dishonesty of any kind, or failure in business, means public dishonor, and utterly hars the dishonest from any future public consideration. Four millions of people live within an area of 20,000 square miles, a fact unprecedented in any other country; and all appear to be happy, prosperous and contented. The secret of this prosperity lies in the fact that all live within their income, and that industry and honesty are principles so firmly established, that their violation is looked upon as an outrage on the national characteristics.

The New Furnace.

The Schieveley brothers, are confident they have discovered what mining men have long been trying to find—a way to work rebellious ores successfully. They say that Meadow Lake ore is much easier worked than Peavine, but they made a test of Golden Fleece ore and worked it so perfectly that no traces of metal of any kind could be found in the slag. The Fleece ore given them assayed \$31.20 to the ton, and out of 38 pounds of ore they cleaned up eleven ounces of bullion. Mr. Harris is here, while the Schieveley brothers are in San Francisco, making purchases of such materials as they may need. They have examined the furnace made by Mr. Creal, and find, with some remodeling, it will answer their purpose, and are now making such changes as they need. By Saturday they hope to be ready to test the new furnace, and are confident that "Eureka" will be the universal cry of all who witness it. The gentlemen desire no fuss made of the matter. They are here to give a practical test of what they believe to be a certain process, and are willing to abide by the results. In fact they shun all attempt at newspaper notoriety and are quietly minding their own business. We hope for the good of the Pacific coast, and of this country particularly, that the right way to work rebellious ores has been discovered at last. If so, just think of the many districts that will be opened up immediately—Meadow Lake—that city of a day; Peavine—where so many of us have sunk so much money. We hope next Saturday's test will prove pre-eminently a success.—*Reno Journal.*

Of the 6,000,000 Roman Catholic in the United States, 1,237,000 are said to be Germans.

The Mathematics of Strikes.

The following remarks of Sir Edmund Beckett, Q. C., in a communication to the *Times*, will be read with interest in the present crisis:

It is surprising how little the men have yet realized the fundamental piece of mathematics of unionism, viz., that even a successful strike for a difference of, say, a tenth for n weeks is a loss, unless it is followed by 10 times n weeks of the higher wages, and so for any other fraction. Therefore, a six months' strike for a 10% rise, against a fall, will require five years of the higher wages to prevent it being a loss; and that is determined by other circumstances long before five years, or two, or one. An unsuccessful strike is, of course, a dead loss forever, and a double one, for it is first a loss to their men and their fellows, who are taxed for them by the union; and, secondly, a loss of all the masters' profits, which would have come back to working men in paying for more labor. And they always profess to consider the interests of all their class, and think they can spread wealth more widely over them by producing as little of it for the masters as they can, which is ultimately for their own class. Arbitrations are another fallacy, though some people fancy they are the panacea for all these difficulties, and we hear of all sorts of schemes proposed for standing arbitration machinery, when nature has provided a self-acting machinery infinitely better. An arbitrator's award, even if it happens to be right, or the same as perfectly free trade would have settled, is an attempt to legislate prospectively what wages are to be generally, it seems, for six months; and if no time is fixed, the arbitration is nonsense, for the parties may differ again next week. It is as absurd to fix the price of labor beforehand as the price of bread and butter. If the makers of them found they could not make a profit by selling them at the prescribed price, they would sell none, and everybody would have to make their own or go without or secretly pay more. What would workmen say to Parliament every July fixing the price of labor of all kinds, and, consequently, of everything they have to buy, until they meet again in February? An arbitration may be a less temporary evil than a strike, though I am by no means sure of that as a general rule, and that is not saying much for them.

INCREASED INTEREST IN MINING.—Before I leave the region of down-town let me mention the large and rapid increase of business at the New York Mining Board. Seats have quadrupled in value in the past three months. By amicable arrangement with the Stock Exchange the Mining Board takes the business of all enterprises under the earth, and as railway speculation is for the present utterly dead, the regular brokers are all flocking into the Mining Board, where business in gold and silver stocks is very lively. Thus far, from considerable personal knowledge, I may say that the majority of the mining stocks dealt in are as worthless as an equal number of railway stocks at the regular board, but there is a genuine outside interest here in developing honest mines, and if the skin game of the old "New York Petroleum and Mining Board" is attempted to be renewed, representation of value in stock certificates will be charged to fractional parts of the entire ownership, and so far as New York money is concerned, mining will be entered into as a steady, permanent business, and owners of these fractional interests will look after them as closely as any other actual property. The way in which railway companies are managed nowadays entirely ignores the slightest responsibility to or treats with the least courtesy the unfortunate owner of say 100 shares of stock.—*Buffalo Commercial.*

THE GROWTH OF LONDON.—Some idea of the rapid and gigantic growth of the British Metropolis may be gained from the statistics recently furnished by Col. Henderson, Commissioner of the London Metropolitan Police. He says that during the past year 226 new streets and three new squares have been opened and handed over to the police. They extend over 56 miles, 1,074 yards. Twelve thousand nine hundred and thirty-eight new houses were built during the year, and 4,151 were in course of erection, a considerable increase above previous years. One thousand two hundred and forty-seven miles of new streets have been opened in London since 1850, and there seems no tendency to decrease in the annual rate of progression.—*American Builder.*

A NARROW RAILROAD.—The narrowest railroad in the world is between North Billerica and Bedford, Massachusetts, a distance of eight and a half miles. The track is 10 inches wide. The engine and cars are proportionate with the width of the track. The passenger cars have an aisle in them and a seat on each side, instead of two seats, as in a full-grown car. There are 30 seats in each car. The train runs 12 miles an hour. One grade on the road is 155 feet per mile. The trains consist of two passenger and two freight cars and an engine. The cars and engines have air brakes and all the modern improvements. Ordinary cars weigh four times as much as these little coaches. The cost of the road is \$4,500 per mile, and the running expenses are about one-fourth that of ordinary trains.

When the old City Hall comes to be vacated, as will soon happen, it will likely fall into the hands of the Chinese, in which event the *Real Estate Circular* advocates selling the plaza in front of it, which it believes would bring \$415,250.

Evenings at the White House.

The President and family receive informally in the evening, sometimes in the red room and sometimes in the library. These visits, however, are only made by intimate personal friends, or by those warranted through their acquaintance to call in a social manner. The evenings in the library are very charming. Brilliant and cultivated men and women gather in little knots in different parts of the spacious and cheerful apartment, and wit sparkles and anecdote enlivens conversation. The President frequently disappears. He has a private library, where he retires when any gentleman present wishes to speak with him on matters of policy or politics, but he soon returns, to all appearances as untroubled as if the great sea of public opinion had settled into a perfect calm. Mrs. Hayes entertains her visitors in an easy, courteous, cordial manner, moving among them with stately grace and scattering pleasant words. Great gentleness and sweetness pervade the whole domestic life of the President's family. Little Fannie, the only daughter, a bright child of nine years, the pet and favorite of all who know her, is never visible at dinner or to evening visitors. "I am obliged to compromise with my little lady," remarked Mrs. Hayes, with a smile, "as I found her growing old too fast for her years. We serve her dinner in her room, which she esteems a high compliment." The private dining-room of the President's family is the only one of their private apartments which is on the great main floor of the White House. The meals are breakfast, lunch and dinner, instead of breakfast, dinner and tea, as in the time of Madison. No unusual forms and ceremonies are observed in the service further than those of any gentleman's table. The hospitalities of either lunch or dinner are frankly tendered to any familiar guest who may chance to be calling at the specified hour, and not infrequently accepted. —*Martha J. Lamb, in Harper's Magazine for March.*

MILLIONS OF STOLEN MONEY.—The thirteen lift companies which have collapsed since that sort of thing began, are still in the hands of receivers. There is not the least probability that any of the baker's dozen will ever get a fresh start. Each proved so utterly rotten when daylight was let into it that it could never again get business, even though the insurance department gave permission to go ahead. The whole thirteen companies are managed (or manipulated) by respectable men—men of good social standings—who attend the fashionable churches, and think it would be a good thing to take the ballot away from the working classes. Not having the figures at hand just now, I cannot say exactly how many millions these respectable, religious, suffrage-restriction gentlemen have stolen, or permitted to be stolen, from the confiding policy holders, who were credulous enough to trust them. But the gross amount is no trifle. The liabilities of the Continental foot up \$5,300,000, and the receiver thinks that if the policy holders live long enough, they may ultimately get thirty-five cents on the dollar. The liabilities of the Security amount to something over \$4,000,000, and it is doubtful if over twenty cents on the dollar will ever be paid. It would not be much out of the way to put down the aggregate stealings, or misappropriations, or whatever they may be called, at \$15,000,000. A large part of this sum was unquestionably squandered in loose management, but another large part was certainly spent by the officers in extravagant living. —*From the Hartford Times.*

COAL PRODUCTION.—The coal production of the world has enormously increased during the last 30 years. The six principal coal producing countries are Great Britain, Belgium, the United States, France, Prussia and Austria, including Hungary. These countries produced in 1845 an aggregate of 49,211,400 tons of coal, this aggregate being made up as follows: Great Britain, 31,500,000 tons; Belgium, 4,960,077 tons; the United States, 4,400,000 tons; France, 4,141,617 tons; Prussia, 3,500,000 tons; Austria, 709,706 tons. In 1874 the corresponding aggregate production of the six countries had grown to no less than 253,660,700 tons—Great Britain contributing to this imposing array of figures 125,043,300 tons; Belgium, 14,669,000 tons; the United States, 42,423,900 tons; France, 16,949,000 tons; Prussia, 41,754,600 tons; Austria, 12,810,900 tons. Great Britain produced nearly one-half, it will be seen, of the whole coal extraction effected by the various nations under review. The immense supremacy of Great Britain over her neighbors in the matter of coal mining is reflected in the fact that in 1874 this country raised 39 tons per head of its population, the corresponding proportion in the case of Belgium being 28 tons, in the case of the United States 10½ tons, in the case of France 4½ tons, in the case of Prussia 17 tons, and in the case of Austria 3½ tons. The coal extraction of Great Britain in 1874 was 10 times as large as the corresponding production of Belgium, three times as large as that of the United States, three times as large as that of Prussia, eight times as large as that of France and ten times as large as that of Austria. The coal production per head of the population effected by Belgium in 1874 approached more nearly to that of the United Kingdom than that of any other country. —*The Engineer.*

USEFUL INFORMATION.

Notes on Preserving Wood.

An increased demand for one of the residual coal tar products of gas manufacture is likely to arise, at no distant day, for the purpose of preserving wood from rot, and from the action of the various marine worms that so rapidly destroy woodwork in salt water. By permission of the Directors of the American Society of Civil Engineers, a paper of great interest in this connection was read by Mr. E. R. Andrews, of Boston; specimens of wood were exhibited which have been treated 20 years, and in constant use in railroad ties which showed no signs of decay. The process, as described, consists in extracting the sap from "green" wood, placed "in vacuo," and then filling the pores thus emptied of their sap with creosote oil under a pressure of from 60 to 100 pounds. Results obtained abroad have established the practicability of the process, and its perfect success in preserving timber.

A writer in the *Journal of Forestry* gives the following on preserving fence posts: What I would recommend with fence posts is: the materials, when felled, to be directly sawn into posts, and stored under sheds thoroughly ventilated, where they will remain at least a year exposed to sun and wind. The neck, or part between wind and water, of each post should be slowly charred over a strong fire—slowly, because our principle means heating the timber thoroughly to the heart, so as to extract any moisture which may still be lodged at the center, and hardening a crust on the surface of the posts.

Afterward, to prevent the posts absorbing water, they should be well coated with coal tar, having its acid destroyed with fresh quicklime. The tar should be thoroughly boiled, to evaporate all watery matter, and applied boiling hot. A large tank holding the posts set on end, and filled with the scalding tar from a boiler, answers the purpose very well. Of course the upper half of the posts can be painted when placed "in place." I am fully convinced coal tar, properly applied to thoroughly seasoned timber, is far more effectual in preserving posts than creosoting, poisoning, kyanizing, or all the paraphernalia of iron prongs, sheet-iron wrappers (an American invention), etc. One great recommendation in favor of the above process is that it requires no skilled labor, and the cost is a mere trifle.

IMITATION TERRA COTTA.—The following recipe from the *Magazin Pittoresque* will enable our readers to convert plaster casts into excellent imitations of terra-cotta ware: The colors required are brick red, lampblack, zinc white, and yellow ochre, all in powder. The object to be treated is first carefully rubbed with "00" sand-paper, so as to remove all roughness of the surface or ridges indicating where the parts of the mold have been joined. The mixed color consists of yellow ochre two parts, brick red two parts, and black one part. These are well rubbed together. Then three parts of zinc white are separately mixed with a little milk to paste. All the ingredients are then combined in a mortar with eight or ten parts of milk, and the resulting mixture is passed through a fine sieve to remove any particles of the white. A soft brush is then used to spread the stain over the object, care being taken to lay it on evenly. After 24 hours' drying a second coat is applied. When the article is completely dry, rubbing with the fingers will eliminate brush marks.

A JEWELER'S TEST FOR GOLD.—A liquid for testing gold, says the *Jeweler and Silversmith*, may be made with two ounces of nitric acid, four drams of water, and one scruple of muriatic acid. The articles should be well mixed together and kept ready for use in a stoppered glass bottle, and the stopper should have a glass prong dipping into the mixture, so that when it is taken out, the article to be tested may be touched by this prong with some of the liquid upon it. But before touching with the acid a file should be drawn over some part of the article, so as to make certain that it is not gilt or plated, and the liquid should be applied to the place of the file marks; if the metal is base the fluid will be immediately detected, as the acid would have no effect on gold. Qualities above nine carat will stand this test. The acid would boil more or less green in inferior qualities; if alloyed with an extra quantity of silver they will only partially stand this test, but the color of the gold would then be considerably paler, which would afford a guide to its value.

CEMENT FOR JOINING AMBER.—A solution of hard copal in pure ether, of the consistency of castor oil, is suggested by Ph. Rust for cementing amber. The carefully-cleaned surfaces of fracture, coated with the solution, should be pressed together, and retained in contact by means of a string wound around the object or in some other suitable way. The operation should be performed as rapidly as possible, since the evaporation of the ether impairs the adhesiveness of the cement; so that all arrangements for compressing the object should be made before laying on the cement. A few days are required for the complete hardening of it. In repairing tubes, as for pipes, any of the solution happening to pass into the interior should be carefully removed at once by a slender feather,

Tests of Foreign Coals.

The Government of Mauritius having become anxious to settle the vexed question of the respective merits of naval coals, they ordered some experiments, the results of which are summarized, below. The trials were made on board the *Victoria* under almost precisely the same conditions as nearly all these kinds of coal are brought to this port and used by our coal consumers; these results will be of local interest. It was found that judging by the standard of economy, Cardiff ranks first, being followed by Sydney, New South Wales; the third place is occupied by West Hartley; Lambton, New South Wales, stands fourth; while Scotch coal stands last. Judging, however, by the standard of ash production, the order is the exact reverse. Scotch 1 (*i.e.*, formed least ash); Lambton, New South Wales, 2; West Hartley 3; Sydney, New South Wales, 4; Cardiff, 5. For maintaining a regular supply of steam at a certain pressure (10 pounds per square inch), the samples gave the following results:—Lambton, New South Wales, 1 (best steaming); West Hartley, 2; Scotch, 3; Sydney, New South Wales, 4; Cardiff, 5. Comparing the cost per ton of coals here, they take the following order:—Scotch, 1 (*i.e.*, the cheapest); West Hartley 2, Cardiff, 3; Sydney, 4; Lambton, 5.

The officers are therefore of opinion that on the score of economical consumption, free steaming qualities, comparative freedom from ashes, and lowness of price, the Scotch coal takes the first place, and West Hartley or Newcastle coal the second. A judicious mixture of these two kinds of coal, in a proportion of one-third West Hartley to two-thirds Scotch, would probably, they consider, give excellent results. No direct experiments were carried out upon the railway, as it has long been known by one of the members of the trials committee, that Australian (Lambton) and South Yorkshire are the most suitable and economical for the engines upon this railway. Cardiff is unsuitable for its intense heat and quantity of ash formed. Scotch is not mechanically strong enough to resist the intense blast.

FROG CULTURE.—Frog culture is the latest Western industry, and is being systematically carried on in Minnesota. It is a simple process, consisting chiefly in the protection of eggs and tadpoles from birds and other enemies by means of wire screens. The product thus far reported amounts to 3,000 dozen legs, of which two-thirds have been shipped to St. Louis, where they bring an average of 20 cents per dozen.

GOOD HEALTH.

A Cold Poem.

I dobt such object to a sneeze d'ow a'd thed.
It waked wud up, a'd it clears out the head—
But, whed wud is sneez'g frod horrif to dight,
It's rather bodolious—ah I dot right?
I subtithe quite fadcy by head will cub off
Id wud of these sneezes—they're worse thad a cough.
A cough tears your ludge, but a sneeze tears you
through—
A'd—goodness!—it's cubbig'—a—tschoo!—a—tschoo!
That sneeze was a bild wud—I thidk subth'g we'd
Idside of by head—p'raps hy hrad-pad is red.
That's doth'g to what it cad do whed it tries!
It rips through by chest, a'd tears out at by eyes,
By dose a'd by houth, with a shiver'g crash,
That shatters by frahe wud horrible shash!
Ah! that is a sneeze!—Whed it cubs it's a crusher—
A'd—od! it's cubbig'—ar—r—ruschah!—
ar—r—r—rusch—ah! —*Punch.*

Airing Beds.

No housekeeper has any valid claim to neatness, cleanliness and tidiness, says the *Watchman*, who makes her beds as soon as they are vacated; or if she has such a claim, it is based on the condition of ignorance. To demonstrate this, let it be remembered that of all the food and drink taken, about three-fifths pass out of the system through the outlets of the skin—the pores, about seven millions in number. This waste and effete putrid matter is dead and poisonous, passing off more rapidly by night, and becoming more or less entangled in the bedding and on the surface of the body. Hence the necessity for hatching and brushing, with still greater necessity for airing and purifying the bedding. This is done most effectually by exposure in the light of the sun and in the morning air. Indeed, the sun is the great purifier, and "nothing is hid from the heat thereof." And here it may be remembered that the hedding of the sick, so soon saturated by the filth of acute disease, by being changed once in at least six hours, and exposed to the free sunlight for the same time, will be safe with half the washing otherwise absolutely needed. Such clothes cannot be kept too clean, while there is no danger of too much care in these respects, as one of the means of controlling such acute diseases as fevers and inflammations.

The Dutch method of placing all of the movable clothes of the bed on two chairs near the window, allowing them to remain till afternoon, might well be copied by Yankee housekeepers.

A NOTE FOR BEER DRINKERS.—A general impression prevails that "ignorance is bliss." This, says the *Medical Examiner*, manifestly depends on the nature of the ignorance and the nature of the bliss; for example, it surely cannot be a blissful state to be acquainted with the

following preparations that are advertised, and, we presume, used by town and country brewers: "Bavarian bitter, one pound equals 64 pounds of hops. For adding to copper, or when reaked." "Bisulphite of lime, for the prevention of acetous fermentation of beer." "Double Humulin (aroma), for flavoring milk-like pale ales, one pound equal to 32 pounds of hops." "Burton water crystals, especially recommended to brewers for rendering ales more preservative, improving attenuation, dropping clearer, paler in color, more sparkling." The quotations we have given are from the advertisement sheet of a well-known and officially published class journal, and clearly show that ignorance produces at any rate in the beer-drinker, headache and stomach-ache, rather than the bliss that poets write of. Now, if we could but restore the brewers of England to that condition of ignorance when they could only brew beer with malt and hops, we might fairly regard it as a case of ignorance being bliss. As it is, however, this age of science has produced brewers that are chemists, and wine merchants that are perfect masters in that mysterious department of knowledge which is euphemistically called "blending." We can sincerely complain of the danger that has arisen from a little knowledge; our trouble has clearly come from our drink-makers knowing too much.

COLD IN THE EYES.—The white matter appearing at times, usually in the morning, on the eyes and around the eyelids, is caused by a cold settling in the eyes, irritating them and causing a mucus deposit not very unlike the mucus deposited on the membrane of the throat from similar causes. As the eye is quiet and closed during sleep, at night, this deposit forms in sufficient quantity to be perceptible in the morning, and sometimes, frequently in the case of children, gums the lids together. As to the cure, it should be strictly observed that this matter must never be pulled or picked from the eyelids, nor the eye opened by any force. The best thing to do is to wash the eye very carefully in tepid, or lukewarm water, nothing else, using a soft sponge, until the white matter is washed away and the eye is clear. This will require patience, as it must be soaked off, not rubbed off. If the eye then shows any signs of inflammation by redness, or pain, a wash will be necessary. The simplest is made by dissolving a small piece of common borax in a cupful of strong green tea, and wash the eye with it often. Another is made by putting a few drops of cream or very fine sweet oil, into the eye. But if the eye be very red, the nearest druggist will make you a weak solution of sugar of lead and water for a wash. This mixture must be handled with great care. It is a rank poison if taken internally, and as it resembles milk and tastes sweet, it must be locked up where it cannot be mistaken. If used on children's eyes, be careful they do not put their fingers to the eye and then suck them. Should the eye grow worse, call in a good doctor, and do what he says. You cannot afford to run any risk at all with your eye. During all such abnormal conditions of the eye as indicated by these secretions and inflammation, it should be carefully shaded and rested. Especially bright lights, reading of all kinds, exposure to sudden changes from light to darkness, etc., must be studiously avoided. A little negligence in these things may easily bring on inflammation of the optic nerve, or chronic weakness, causing weeks of confinement in a dark room, and very probable permanent injury to these very delicate organs.

DIPHTHERIA CAUGHT FROM CALVES.—Dr. Dammann, says the *London Farmer*, has been recently engaged in some observations upon diphtheria in calves, and its probable transmissibility from them to man. On post mortem examination of a calf which had succumbed to the disease after communicating it to other animals in the same shed, he found the false membrane on the mucous membrane of the jaws, the upper lip, the nostril, and the cheeks. There were also deposits of pus in the lungs, and circumscribed inflammation of the pleura. A healthy calf, introduced into the shed where two calves suffering from diphtheria were housed, rapidly fell ill of the same disease, recovering in three or four weeks under appropriate treatment. The false membrane deposited in this case was of great thickness, and under the microscope showed similar appearances to those of diphtheritic membranes in the human subject. The inspector who conducted the treatment was attacked with an affection of the throat, which was diagnosed as true diphtheria, and from this and several other observations Dr. Dammann is of opinion that calves are often the subject of diphtheritic contagion, and that the communication of the disease from them to man is highly probable.

LIFE LENGTHENED.—In all countries and all latitudes, the well-to-do live longer than the poor by an average of eleven years; this shows the deleterious influence of an anxious mind on the bodily health, the anxiety for to-morrow's bread. Pensioned persons live indefinitely long; poor-houses of Great Britain can any day turn out a large army of men and women among the eighties and nineties who have been in those institutions for twenty and thirty years, owing in great part to an habitual feeling of confidence that ample provision is made for the future, and the mind is at rest; but it must not be forgotten that the cleanliness, the plain food, and the regular habits, compulsory in those institutions, contribute greatly to the end.

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The Week.

Having rained heavily and steadily throughout January, and kept on with almost equal persistence through the month of February, the weather, contrary to all precedent, has maintained its dripping mood to the middle of March, at which time the clouds are still lowering and threatening more rain. The late rainfalls have, however, come so gently that there has been no increase of water on the flooded districts. On the contrary, the deluge has for the past week been steadily subsiding, much of the overflowed land being now not only free from water, but once more nearly dry. The growth of grass is luxuriant beyond example, the cereal crops being also well advanced where not injured by the floods. From all parts of the State the most encouraging accounts come to hand as regards the prospects of both the farmers and the miners. That more gold will be taken from our placer mines this season than for many years past seems now certain, there being water enough for the use of every class of miners. In stock circles the principal topic of conversation has been the rise in Ophir, to which we refer more fully in another column.

A Nuisance That Should Be Abated.

Now that the State Legislature are enacting laws empowering our municipal authorities to make provision for grading and repairing the streets and for the performance of other public work requiring to be done, it would be well if some provision were at the same time made for compelling the owners of vacant lots which, lying much below the city grade, have become the common receptacles of stagnant water and all kinds of filth, to fill in the same. No better time than the present will ever be found for executing this work. The city is full of laborers anxious for and greatly in need of employment. They are able-bodied men, willing to do a full day's work and find themselves for the moderate pittance of one dollar a day. The dry weather is at hand when these men can toil without interruption, and the work of filling in these loathsome sinks can be carried on to advantage.

In the southerly part of the city, in the district bounded by Folsom, Tenth, Brannan and Twenty-eighth streets, are acres and acres—whole blocks of land—covered at all times with putrid water, some of it to a depth of several feet, the surface of these pools and miniature lakes being hidden by a thick green scum, indicative of their stagnant and noxious character. They are, in fact, pregnant with the seeds of disease and clammy with filth. Lying below the level of the great Channel street sewer, designed to carry off the water from this section, they have no drainage. Many sewers discharge into them, also the outpourings of the soap factories, tanneries, breweries, woolen mills and other industrial establishments with which that part of the city abounds. They are, in short, the reservoirs of all the death-distilling slumsgathered from nearly one-third of the Eleventh ward, in which the greater portion of these noxious fens are situated. This ward, which ought to be one of the most healthy, is, as our mortality reports show, one of the most unhealthy in the city. The death rates are higher here in the suburbs than along the wharves and in the densely populated portions of the town, a result directly traceable to the presence here of these pestilential marshes. The whole neighborhood reeks with effluvia. The stench is intolerable. The mosquitoes swarm the year round. The diphtheria is especially prevalent and always deadly. It is probable that more than a thousand children have perished in this district who would be now alive and well, but for the causes mentioned. That Supervisor Gibbs should, at a recent meeting held to consider this evil, have spoken so bitterly of a State Senator, charging him with having caused the death of his child, is not to be wondered at; and there are hundreds of parents living in this infected neighborhood who feel toward our Legislature and city authorities much the same way.

What aggravates this whole business is the fact that the most of this submerged property belongs to a few rich men who neither live upon nor improve it; but, having, in the first instance, grabbed it in the general scramble for the Pueblo lands, have since held on, refusing to either reclaim or build, trusting for it to appreciate in value with the growth of the city around it. The time has come when these men should be compelled to fill up these cesspools, if they will do no more. This could be effected easily and at little cost, inasmuch as the owners of the adjacent heights, which could be used for filling them in, would pay liberally to have so much of their ground removed as would bring their lots down to the common grade. There ought to be 500 men set to work here at once. This is due to the residents of the infected district, while it would give employment to the many needy and deserving men now out of work. Will those whose duty it is to look after this matter do so at once.

Values of Mines.

Those who are not up to the mysteries of the stock market, on looking over the prices of shares as quoted to-day, might suppose that our great gold and silver-bearing ledges were exhausted, and that the quartz mines which have been the great source of wealth to California, Nevada and Idaho were things of the past, and no longer presented any chance for the investment of capital. Without a great many words, it is impossible to explain away the fact that within the past year the mines on the Comstock have greatly depreciated in value, and in the case of mines in other districts, they have dropped out of sight altogether. We are constantly receiving letters from Eastern parties to inquire the whereabouts of officers of mining companies of which even the name has been forgotten here. Stocks sold ten years ago, and hoarded up by ignorant persons ever since, have been brought to light during the hard times of the past year, with the hope that they were worth something.

It is difficult to explain how this great depreciation has taken place on the Comstock in the face of a steadily increasing yield of bullion and no noteworthy increase of expenses. The quantity and quality of ore extracted in California

and Nevada has been fully up to the standard, and yet, with some few exceptions, we hear of more assessments than dividends.

The Comstock mines still rule the roost on the stock list, but at greatly depreciated figures. The California mines listed are few, and show no dividend-paying ones of any moment. The Idaho mines are out of sight, and the Arizona ones have not yet come prominently to the front. All these things are working sadly against our mining interests. In England, with their stupid, old-country notions of honesty and fair play, they insist that the mines are failures, because they do not pay dividends and yet take so much money to keep them up. These evils are the outgrowth of the stock gambling system, or rather the had features of that system, and also of the reckless extravagance of former years, combined with the many examples lately shown up of how easy it is for insiders to rob outsiders without redress at law.

These gigantic evils are remedying themselves. People will not buy stocks unless they have some guarantee that their money is not at the mercy of any freebooting "Trustees" who may turn up in the company; and unless they know that such thieves and defaulters can be punished. The mines will remain at their present low values until confidence is restored, and people will give up their stock rather than pay assessments when they know that the money will not be applied to legitimate mining purposes.

Justice to the Northern Counties.

The Trinity Journal's last issue, in alluding to an article published in the Press, February 23d, giving the product of the various mines and mining localities on this coast in 1877, expresses the opinion that our estimate for Shasta, Trinity and Siskiyou counties was too low. This may well be, the error arising from our making as large allowance for the effects of the drouth in these as in the central and more southerly counties of the State. The Journal, after careful inquiry, finds that the gold yield of Trinity for 1877 could not have been less than \$1,000,000. The gold bars and bullion shipped from Weaverville, whence the greater part of the treasure shipments from Trinity are made, amounted in 1876 to \$605,594.50, and in 1877 to \$514,475. This, it is believed, did not cover more than one-half the amount actually produced in the county during these two years, as the larger companies, and others who make a considerable production, are in the habit of remitting their bullion to the Mint in San Francisco by private hands, finding this cheaper than to pay the express charges, which amount to \$6.50 per \$1,000 each way. Many of the companies working the best mines clean up but once a year—at the end of the season—say from May to August inclusive, according as the winter has been dry or wet. After the clean-up comes a period of rest in which nothing is done in the mines, lasting from a few weeks to a few months. It therefore happens that one of the partners takes a trip to San Francisco, and with him goes the sum total of the year's work in the claim in which he is interested. In each of such cases the amounts vary from \$5,000 to \$25,000 or more. Of gold dust leaving the county in this manner there is of course no record, but the fact is well known, and the amount going that way is very large. Lewiston, Trinity Center, and the northern part of the county ship but little dust from Weaverville, and much of that taken out on New River and Lower Trinity finds an exit through Humboldt county. It is also probable that less than 50 per cent. of the gold mined by Chinese ever finds its way into the hands of the whites or is shipped through the express. From all these facts it seems plain that the estimate of 50 per cent. sent by express is large enough.

The difference in the shipments for 1876 and 1877 needs no explanation when it is known that the former was a very favorable mining season and the latter exactly the reverse. It might also be added that in a good season a larger percentage of dust is transported by private hand than in a poor season, for the obvious reason that a man can afford to take \$10,000 to the Mint, when the saving on \$5,000 would not justify the trip.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Northern Belle, March 4th, \$2,038.37; Christy, 7th, \$7,680; Tybo Con., 6th, \$9,180.40; Christy, 11th, \$7,116; Christy, 8th, \$3,362; Standard, 6th, \$29,432.02; Tybo Con., 8th, \$4,696.21; Manhattan, 12th, \$16,138.60; Northern Belle, 9th, \$3,013.86; Con. Virginia, 9th, \$374,332.95; California, 9th, \$225,474.90; Northern Belle, 6th, \$3,929.39; Tybo Con., 3d, \$8,877.09; Grand Prize, 9th, \$19,000; Martin White, 9th, \$18,243; Endowment, 13th, \$1,873.05.

The canneries on the Columbia are actively preparing for the coming season's work. Large forces of men, white and Chinese, are being engaged, and if the run of fish is ordinarily good, employment for a vast army of men will be supplied.

The snow blockade that has obstructed the Union Pacific road for several days, has been raised, and travel resumed.

Calaveras County Mines.

In the MINING AND SCIENTIFIC PRESS, of September 1st, 1877, we gave an account of a rich strike in quartz made by Messrs. Lamhing and Durst, at Corral gulch, near El Dorado, Calaveras county, not far from the Sheep Ranch mine. In this gulch in the early days many rich specimens were found, but all efforts to discover the ledge from which they evidently came were unsuccessful. Hearing of these facts these two men started in to find the ledge, and struck it the first day, and it was remarkably rich. The ledge was from 15 to 30 inches wide, and is called the "Hero." At the time, we mentioned the ledge before, Mr. Lamhing brought to the city 49 pounds of the specimen rock, which he sold to the jewelers here for \$886.42.

Mr. Lamhing came to town this week again, with another lot of specimen ore for jeweler's purposes, which he showed to us. It is extremely rich, and just the thing for quartz jewelry. They have made one crushing of 250 tons in their eight-stamp mill this month, which cleaned up \$16 per ton. Some 50 tons of this was pretty good rock and the balance poor. It was crushed as it came, but they expect the next run to be much better.

Since his last visit, Mr. Lamhing has located three ledges more, two of them very good and the third only a good prospect. He has taught his little boys something about prospecting, and they found a piece of cropping about as big as a man's head, within 300 yards of the mill, on Murray creek. It was all there was above ground, but in going to work a fine 20-inch ledge was developed, which has been stripped some 60 feet, and shows free gold plentifully. It is good milling rock and prospects well. A tunnel is now being run on this ledge which is called the "Live Oak."

On the other two ledges not very much work has been done, but they expect their next crushing from the Hero and Live Oak will be good ones. They have been unable to do much at the mill this winter, as they were short of wood and the roads were too bad for hauling. The battery of this mill is set on solid live oak, set endwise on the bedrock.

Mr. Lamhing says mining matters are looking very well in the section referred to, better than for the past two years. Everybody is busy that has placer mines to work, with prospects of keeping it up all summer. The ground was never more thoroughly soaked than it is now.

There are lots of other localities in this State which will hear more thorough prospecting than they have received, and if some of the men, who are now spending their earnings in the city waiting for something to turn up, would go and try to turn up a ledge or two they would be better off. Some of them, too, who are going, at considerable expense way over to the Black Hills or Arizona, would do better to take the money it costs them to get there and prospect on it in some part of California, where there are yet many undiscovered ledges waiting for the lucky man who will uncover them.

Large and Small Mining Companies.

Intelligent people everywhere know that nothing exceeds the permanence of a really well defined silver lode, some of which have been worked over a thousand years, and are still productive. They also know that a well defined lode of gold-bearing quartz is a valuable property which will pay out fortunes to its owners. But they know also that no matter how good the lode, or how rich its ore, neither will ever pay unless properly managed in an economical manner. Reckless management has done more to hurt mining and make unprofitable mines, than the miners themselves. Expenses must be cut down to the last cent consistent with an intelligent system of work, and officers and non-producers should be dispensed with except where absolutely necessary, and in mines employing a small force, one superintendent or good foreman is all of this class that is required. When a mine has a President, Secretary, Assistant Secretary, General Manager, Superintendent, underground foreman, surface foreman, timber man, clerk, time keeper, weigher, blacksmith, hoister, etc., there is not generally enough money left to pay more than one or two miners to keep up appearances, and assessments are likely to be more frequent than dividends.

This is one reason why "close corporations" or small companies are more successful than large ones. The big ones have too many salaried officers and too few workers to be successful. The small companies are usually managed by men who are directly interested in the results of the work, and who work themselves.

We are fast learning these facts by experience here, and it is everywhere admitted that small companies are more successful than large ones, generally speaking. People who want to go into any mining venture will do much better to get hold of a claim or prospect, develop it slowly until its worth is proven and then if machinery is needed, put it up. But the old-fashioned style of getting up a lot of machinery before a mine is shown to be worth a cent, is "played out." Big companies pay the promoters and insiders, but small ones are much more apt to be profitable to the small shareholder.

Woodward's Gardens.

The Central Park of the Pacific.

No one of the interesting sights of San Francisco more fully and justly attracts the attention of tourists, other visitors, and our own citizens, than Woodward's Gardens. Though the private property of Mr. R. B. Woodward, who established them in 1866, they and their public spirited owner have now become thoroughly identified with the interests of the city. They may be correctly termed the "Eden of the West," unequaled on the American continent. In them, Nature, Art and Science, are well illustrated, and their aims are: Education, recreation, and amusement. It is true that in no city in the world, unless it be Paris, or London, can so varied and complete a collection of remarkable objects of nature and art be found in one place, as at Woodward's. The celebrated Garden of Plants in Paris, and Kew Gardens near London, are, perhaps, the only real exceptions. Hence, for education of young and old alike, for their entertainment, or amusement, and for all innocent pleasure, no place surpasses these charming gardens. For all these reasons, we deem it but justice to an enterprise that has done so much credit to our city and State, to give the accompanying excellent engraving of part of the extensive grounds

his assistants, Messrs. Wm. Woodward, Manager; M. E. Willis, Treasurer; Chas. H. Williams, Director of Amusements; C. Shuman, Superintendent of Aquarium and Conservatories; Prof. F. Gruber, Curator of Museum; B. F. Roop, in charge of birds and animals; and C. J. Woodward, manager of restaurant and refreshment saloons.

In the art gallery, pictures have all been retouched, freshened and rearranged; the numerous animals and plants are in the very best order; the conservatory was never more thriving and beautiful, the grounds never looking more charming. The "baby-camel," born in the gardens, February 1st, attracts much attention. Not only does one of the best orchestral bands discourse sweet music on special occasions, but daily visitors are delighted by the choice selection of standard pieces performed exquisitely by a fine large orchestra—or full brass band, arranged like an organ and run by clock-work—manufactured by Schoensteiu, in Villingen, Baden. Having 10 or a dozen separate cylinders, it performs 30 or 40 pieces. The vast colossal bust of Washington, 11 feet high, now in course of construction by Tbos. Gagliardi, in the sculptor's study, deservedly attracts much attention.

Never does a week pass without additions of interest to some part of the already large collections of the curious, the wonderful, the rare, the instructive, the entertaining. Yet with all

Uses and Importance of the Diamond Drill.

Why the diamond drill as a means for prospecting mines has not come into more general use seems a little strange, considering its well attested efficiency for that purpose. Where shafts have been sunk and lateral drifts driven, it would seem as if this implement instead of crosscuttings might always be used to advantage. In exploring for ore bodies or mineral deposits generally, we can see nothing to hinder its employment. Wherever availed of for this purpose it has, we believe, given satisfaction. Rossiter W. Raymond, than whom we have no better authority on this and analogous subjects, has expressed the opinion that the prospective value of mines may, through its instrumentality, be very closely and economically ascertained. A number of iron companies operating in New York and Pennsylvania have declared in its favor as an agent for testing the dimensions and quality of uncovered ore bodies, and for exploring mineral wealth. The testimonials in its favor are, in fact, quite conclusive, leaving us to wonder why recourse to such a sensible and expeditious mode for accomplish-

diamond drill on the Washoe mines. This was in October, 1872, when it was used by him for prospecting the Plutas claim, of which he was part owner and which was afterwards consolidated with the California. Here several holes were bored, some of them as much as 600 feet deep, and a good showing of ore obtained from a probable spur of the present Bonanza mines. Gen. Williams has great confidence in this drill as a means of searching for ore, a feeling in which E. J. Baldwin, it is said, largely partakes.

Irrespective of the manner in which the diamond drill may have been used on the Comstock lode or the abuses to which it may elsewhere be perverted, it doubtless possesses merits which strongly recommend it to the mining community. As this machine is capable of being driven by compressed air, conducted through a tube, it can be operated at any distance from the steam engine or other power employed for effecting the air compression. The drill can be run in any direction, horizontal, vertical or angular. Through the hollow drill-rod a stream of water is forced, which keeps the bit cool, and, by its upward current, frees the hole of sediment. This sediment, when ore is being looked for, is assayed as often as is deemed necessary, the character of the material through which the drill is passing being thus easily ascertained. The bits used are of two kinds, the "solid," which pulverizes the rock, and the "core," which retains the round



SCENE IN WOODWARD'S GARDENS, SAN FRANCISCO.

and buildings, and a brief sketch of its numerous attractions. A mere enumeration of these will give some idea of their extensive character. They embrace the museum, the botanical department—including the rotunda, conservatory, orangery—the art gallery, seal ponds, plant and tropical greenhouses, fern house, aquatic fowls, polytechnic ball, marine and fresh water aquarium, trout and carp pond, menagerie—with its small animal house, bear-pit, smaller animal cages, large animal enclosures, fox burrows, and poultry house—a kiosk and refreshment stand, the fountain, aviary, pavilion and skating rink, performances and exhibitions, open air orchestra, a fine German orchestra, a Turkish mosque, music hall, restaurant, eagle aviary, Italian terrace, rotary boat and lake, gymnasium and swings, sculptor's study, camera-obscura, and the small and beautiful Baxter steam engine. Every curiosity is genuine and the best of its kind. There is no attempt at deception or misrepresentation.

These instructive and delightful pleasure gardens are being placed in the finest condition possible for the rapidly approaching spring and summer. Many additions have been made to the already vast number of interesting objects. It is no exaggeration to say that by the arrival of our usually fine spring weather, every portion of the beautiful grounds, the complete collections in the various domains of nature, science and art—as well as the regular and attractive music and first-class performances for the entertainment of visitors—will be presented in a better and more thorough condition than ever before. As usual with their proprietor, neither expense nor pains have been spared to accomplish this result.

Mr. Woodward's efforts are ably seconded by

this, one of the most striking features of this popular place of resort is the low rate of admission to the whole, which is regularly 25 cents, and for children 10 cents. Special terms below these rates are made with organizations, schools and festivals generally, day and evening. Grand and special performances take place Saturdays, Sundays and holidays without extra charge. Every one who visits Woodward's Gardens feels more than repaid. Not only San Francisco, but California has good reason to be proud of them. We may give our readers fuller details of some of their more attractive features hereafter.

PLATINUM IN COLORADO.—Theo. F. Van Wagenen, reports that in examining some samples of ore recently sent to his office from Fairplay, he found a notable quantity of platinum, with which are associated probably two or more of the other rare metals of this class. Two years ago, he says, platinum was reported to have been found in that vicinity, but he has heard nothing on the subject since. He also says, that in several samples of the mineral recently struck in Governor Routt's mine in California gulch, embolite (chloro-bromide of silver) is quite abundant.

A TIMBER BILL.—Representative Wren has introduced a bill in Congress authorizing citizens of California, Nevada, Colorado or any Territory to take timber from unsurveyed mineral lands for mining or domestic purposes, under such regulations as the Secretary of the Interior may prescribe to protect undergrowth, provided that no timber shall be cut in mountain regions within three miles of the upper timber line.

ing this sort of work has not been more common. The first application of diamonds in rock drilling having been made by the inventor, Rudolph Leschot, a French civil engineer, as early as 1863, our miners have had ample time to become acquainted with the advantages of this implement.

That they have been so backward in availing themselves of its benefits may perhaps be due in part to the prejudice that exists against it, growing out of the popular impression that it has been employed by the managers of certain mines on the Comstock for prospecting the ore bodies in advance and using the knowledge so obtained for their own private ends. This objection establishes by implication the efficiency of the drill itself, all that is necessary to obviate the force of the objection, being greater vigilance on the part of shareholders.

That this instrument has been used in some of the mines on the Comstock is, of course, well understood; but to what extent, if at all, it has been made to further any such selfish purposes as are above alluded to, we have no means of knowing. A contemporary, who professes to have informed itself on this point, states that there are at present more than 20 of them in use on that lode, the smallest supplied with a two-inch bit and all capable of boring for a distance of 2,000 feet in any direction. It is alleged, however, that the shareholders generally know nothing of their existence, they being private property and used only for the benefit of the owners. In some instances claims are being prospected by them which have not been opened at all, the machine being operated from the underground works of adjacent mines.

According to the same authority, Gen. Thos. H. Williams was the first to introduce the

core cut out, bringing it to the surface unbroken. The former is most in use on the Comstock, being preferred for prospecting purposes. This style of drill requires few repairs, the diamonds being the only parts that come in contact with the rock, and such is their hardness that 1,000 feet or may be bored without causing them any apparent wear.

FORESTS IN THE UNITED STATES.—Within 10 years no less than 12,000,000 acres of forest have been cut down or burned over in the United States. Much of the timber is used for fuel, 25 cities being on record as consuming 5,000 to 10,000 acres each. Fences use up much timber and railway sleepers require the product of 150,000 acres per annum. The amount of pine and lumber timber yet standing in the United States is no longer large. The sum of \$144,000,000 is estimated to be invested in the whole timber industry, employing 200,000 men.

"COPPS' HAND BOOK OF MINING LAWS," is invaluable to those prospecting for lodes or placer claims and in locating the same and also to those interested in any way in mining properties under the laws of the U. S. The little book gives all the information necessary on these subjects and in a very concise form. No other book that we have met with contains as much information on the subjects treated, on so small a compass. Price \$1. For sale by Dewey & Co., 202 Sanson St., S. F.

THERE is danger of high water in the Feather river, if the deep snow-banks are brought down by a warm rain. At Buckeye, there are five feet, and at Foreman's sheep ranch, on Walker's plains, there are 17 feet of snow and still falling almost every day.

Information Concerning Patents

FOR THE

AUSTRALIAN COLONIES,
EAST INDIA, Etc.

The geographical position of San Francisco, and the fact of having a regular communication by means of a line of steamers, renders our location here particularly favorable for taking out patents in these colonies for United States inventions. For the same reasons we include with these instructions those for the East India patents. American inventors, as a general thing, are not aware that Australia presents a better field for them to patent their inventions in than almost any other country, the United States and England excepted.

Comparatively little is known in the United States of this vast continent situated at the antipodes, and the almost fabulous richness and depth of the soil, the vast strides with which she has advanced in population and wealth are little known.

A correspondent who has lived 19 years in Australia, says: "I have been a little surprised about one thing in connection with your inventors, and that is that they don't make more use of the patent laws of these colonies. It is true that it is somewhat expensive to patent in all the colonies, still it would pay in some cases, and in others it would answer to patent an invention in two or three of the colonies. An efficient reaper and binder would pay to patent in all the colonies; so would an invention for preserving raw meat, or for benefiting those engaged in wool growing, while any really good invention for the benefit of those engaged in gold mining might be advantageously patented in three or four of them. Many American inventions have already been patented here, and have been very remunerative, and, as a rule, when properly pushed, almost any good invention might be made valuable if patented here. Ten times as many British inventions are patented here as American ones, yet it is notorious that the inventive faculty is not near so largely developed in them as in the Americans."

The continent of Australia has an area of 3,000,000 square miles, or nearly as much as that of the United States. A large portion of the interior is waste and unsettled, but wherever the colonies have made a start they have made rapid progress, in population and civilization.

There are seven Australian colonies, five of which are upon the continent, and the other two upon the adjacent islands. Of those on the continent four only are of considerable importance, namely, Victoria, New South Wales, Queensland and South Australia. The fifth—Western Australia—is separated from the rest by nearly 2,000 miles, and is used as a penal station by Great Britain. The island colonies are New Zealand and Tasmania, the first consisting of three islands of considerable size, while the last comprises one island. In importance these colonies stand at present in the order named (leaving out Western Australia), and have a united area of 2,136,180 square miles, with an aggregate population of upwards of 2,110,368 inhabitants. Each of these colonies has a well arranged patent law, and many of the inventions patented in the United States, could be advantageously patented and introduced here.

Victoria.

The first colony in population and importance, though not in size, is Victoria. This colony has an area of 88,198 square miles, and a population of about 800,000 inhabitants. The capital of Victoria is Melbourne, a city of upwards of 240,000 inhabitants.

A patent may be obtained in this colony for any new and useful manufacture. An invention already patented elsewhere may be patented at any time during the continuance of the prior patent, provided it has not been used or illustrated in the colony. An examination is usually made to determine the novelty and utility of the invention.

A patent may be obtained by the inventor whether resident or non-resident, but a mere importer cannot become a patentee. The documents required to obtain a patent are petition, specification and drawings in duplicate and of a given size, one copy being on parchment. The specification must be signed and sealed by the inventor. No model is required.

The term of a patent is fixed at 14 years, but expires with any prior patent. The patent is not required to be worked in the colony. It is subject to a tax of £15 at the end of the third year, and one of £20 at the end of the seventh year. The expenses of a patent for three years, inclusive of government tax and all charges is \$200.

New South Wales.

This colony has an area of 323,437 square miles and a population of about 600,000. Its capital is Sydney, situated at the head of a magnificent harbor, and distant from Melbourne about 600 miles. The pastoral and mining interests predominate at present, and the colony is in a highly flourishing condition.

A patent or letters of registration, as the document is called, may be obtained in this colony for any invention or improvement. The term is 14 years and a preliminary examination is had to determine the novelty and utility of the invention. The patent may be obtained by the inventor, his agent or assignee, either colonist or alien.

The documents required are a petition, duplicate specifications and drawings. The law does not require the invention to be worked. The cost of a patent for the entire term, including

government tax and all other expenses, is \$250.

Queensland.

This colony was set off a few years since from New South Wales, and has an area of 678,600 square miles and a population of upwards of 150,000. Its capital city is Brisbane.

A patent is granted in this colony to the inventor, his agent or assignee, for the term of 14 years, the same as in New South Wales. The documents required are also similar, a petition, duplicate specifications and drawings. The cost of a patent for the entire term, including all charges, is \$250.

South Australia.

This is the largest of the colonies, having an area of 914,730 square miles and a population of 198,257. Its capital is Adelaide.

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This colony has an area of 105,000 square miles, and a population of 310,437. Its capital is Wellington, and its principal city is Auckland.

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Tasmania.

Patents are granted in this colony in essentially the same manner as in Victoria, and for the same time. The total cost is \$200.

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Trade-marks may be registered in the colonies of Victoria, New South Wales, Queensland, New Zealand and Tasmania. The cost of a Victorian trade-mark is \$60, and of the other colonies mentioned, \$50 each.

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An East Indian patent is granted for a term of 14 years, and must be for a new invention of public utility. The applicant must be the inventor, his executor, administrator, or assign, and may be a resident, non-resident, British subject or alien.

The documents necessary are a petition, declaration, specification and drawings, together with five copies, one for each of the Presidencies. The cost of an East Indian patent is \$300.

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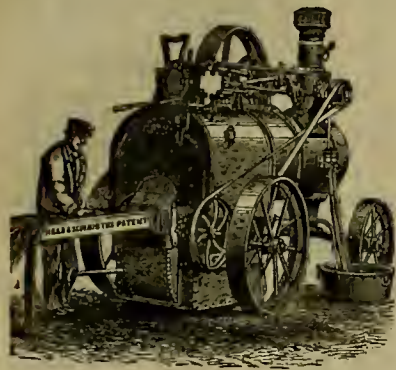
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Alpha.....	104 98	101 101	111 10	99 9
Alta.....	9 8	9 8	8 7	7 6
Andes.....	75c 65c	70c 65c	75c 65c	75c 60c
Alps.....	31 25	21 2	3 80	1 4
Argenta.....	90c 80c	85c 75c	75c 40c	50c 30c
Baltimore Con.....	5 4	4 40	4 4	4 40
Belcher.....	60c 50c	60c 50c	70c 35c	70c 35c
Best & Belcher.....	18c 17c	23c 18c	24c 20c	23c 18c
Bullion.....	3 30	3 5	4 1	3 8
Bechtel.....	1 1	1 1	1 1	1 1
Bodie.....	1 75c	1 85c	1 75c	1 1
Benton.....	3 80	1 20	1 20	1 15c
Cal. Con.....	2 60	2 20	2 30	2 25c
California.....	75c 75c	75c 75c	75c 75c	75c 75c
Challenger.....	33c 31c	32c 31c	32c 31c	32c 31c
Chollar-Potosi.....	45c 45c	50c 50c	44c 44c	44c 44c
Confidence.....	75c 65c	75c 65c	75c 65c	75c 65c
Con Imperial.....	25c 25c	25c 25c	25c 25c	25c 25c
Crown Point.....	5 40	5 40	5 40	5 40
Dayton.....	20c 20c	20c 20c	20c 20c	20c 20c
DeFrees.....	45c 30c	75c 45c	65c 30c	40c 30c
Day.....	95c 75c	11 80c	11 80c	90c 40c
El Dorado.....	13 13	13 13	13 13	13 13
Exchequer.....	3 55	2 35	3 45	3 30
Endowment.....	70c 65c	70c 65c	70c 65c	70c 65c
Gen Thomas.....	25c 15c	10c 10c	10c 10c	10c 10c
Grand Prize.....	55c 50c	70c 55c	70c 50c	70c 55c
Hale & Nor.....	1 95c	80c 75c	80c 60c	60c 60c
Golden Chariot.....	84 81	81 81	81 81	81 81
Gould & Curry.....	101 99	101 101	101 81	101 81
Hale & Norcross.....	101 99	101 101	101 81	101 81
Justice.....	2 35	2 21	2 10	2 20
Leads.....	11 11	11 11	11 81	81 41
Leviathan.....	2 21	2 35	2 21	2 21
Leviathan M Co.....	35c 30c	80c 30c	80c 30c	80c 30c
K & Con.....	3 30	3 1	3 3	3 1
Kentuck.....	10c 10c	10c 10c	10c 10c	10c 10c
Kossuth.....	6 6	6 6	6 6	6 6
Lady Wash.....	40c 30c	60c 30c	55c 55c	55c 55c
Leopard.....	2 15	2 15	2 15	2 15
Leviathan.....	10c 15c	10c 15c	10c 15c	10c 15c
Leviathan M Co.....	10c 15c	10c 15c	10c 15c	10c 15c
Manhattan.....	10c 15c	10c 15c	10c 15c	10c 15c
Meadow Valley.....	25c 20c	25c 20c	25c 20c	25c 20c
Mexican.....	13 13	13 13	13 13	13 13
North Con Virginia.....	58c 30c	15c 15c	65c 10c	65c 10c
New York.....	1 80	1 15	1 05	1 15
Northern Belle.....	11 10	10 10	10 10	10 9
New Coso.....	75c 75c	75c 75c	75c 75c	75c 75c
Northern Belle.....	2 1 70	2 05	1 90	1 80
Occidental.....	54 51	51 51	51 51	51 51
Ophir.....	161 141	154 141	144 141	141 141
Overman.....	30c 30c	45c 30c	45c 30c	45c 30c
Potosi.....	5 5	5 5	5 5	5 5
Raymond & Ely.....	11 10	12 10	12 10	12 8
Rock Island.....	28 25	26 26	26 26	26 26
Sag Belcher.....	1 15	1 40	1 4	1 4
Sierra Nevada.....	3 90	2 35	2 21	2 45
Silver Hill.....	3 20	2 15	2 21	2 15
Succor.....	5 5	5 5	5 5	5 5
Solid Silver.....	80c 60c	1 80	1 20	1 20
Star.....	6 6	6 6	6 6	6 6
Union Con.....	1 6	1 6	1 6	1 6
Utah.....	15c 10c	10c 10c	10c 10c	10c 10c
Wells-Fargo.....	10c 10c	10c 10c	10c 10c	10c 10c
Yellow Jacket.....	10c 10c	10c 10c	10c 10c	10c 10c

Sales at S. F. Stock Exchange.

Friday A. M. Mar. 8.	355 Belcher.....	4.05@4.10	
540 Alta.....	5.67@5.70	630 Bullion.....	55.5@5.61
530 Andes.....	6.50@6.55	600 Best & Belcher.....	65.0@6.55
700 Alpha.....	1.15@1.20	300 Benton.....	65.0@6.55
440 Bullion.....	5.50@5.55	300 Belmont.....	75c
735 Best & Belcher.....	21.0@21.1	600 Belle Isle.....	75c
300 Benton.....	65c	700 Bechtel.....	75c
370 Belcher.....	4.15@4.16	405 California.....	30c@32
195 Chollar.....	3.21@3.22	1360 Con Virginia.....	2.22@2.23
465 California.....	30c	20 Chollar.....	32c
316 Con Virginia.....	2.22@2.23	170 Crown Point.....	55c
320 Crown Point.....	55c	300 Con Imperial.....	45c
700 Con Imperial.....	45c	1150 Confidence.....	65c
300 California.....	2.60@2.65	515 Confidence.....	65c
500 Daney.....	3.85@3.85	845 DeFrees.....	30c@35c
410 Exchequer.....	3.65@3.65	1800 Day.....	11.0@11.0
250 Hale & Curry.....	1.15@1.15	405 Hale & Nor.....	1.15@1.15
450 Hale & Nor.....	9.4@9.4	270 Eureka Con.....	3.83@3.84
685 Justice.....	8.0@8.0	100 Endowment.....	70c
300 Julia.....	2.30@2.31	305 Gould & Curry.....	8.4@8.4
30 Kentuck.....	30c	200 Gila.....	90c
100 Leviathan.....	2.85@2.85	2855 Grand Prize.....	5.5@5.5
100 Mexican.....	1.13@1.13	40 Golden Chariot.....	60c
1275 New York.....	1.15@1.15	450 Hamburg.....	3.0c
95 Ophir.....	5.53@5.53	6300 Hunsley.....	10.1@10.1
150 Overman.....	1.44@1.44	615 Hale & Nor.....	9.9@9.9
320 Potosi.....	4.15@4.15	405 Horne.....	3.0c
400 Sierra Nevada.....	4.1@4.15	350 Independent.....	1.0@1.05
540 Sil. R. Hill.....	2.41@2.45	225 Justice.....	8.1
300 Senator.....	3.1@3.14	625 Julia.....	2.20@2.21
300 Solid Silver.....	4.15@4.15	625 Jackson.....	2.20@2.21
700 St. Louis.....	20c	100 Kentuck.....	30c
1145 Trojan.....	5.0@5.0	375 Leeds.....	2c
65 Union Con.....	5.1@5.1	45 Leopard.....	50c
150 Utah.....	1.12@1.12	365 Mexican.....	1.13@1.13
250 Ward.....	1.12@1.12	350 Manhattan.....	10c
300 Woodville.....	60c	150 Monumental.....	5c
200 Wells-Fargo.....	5c	510 Navajo.....	2.02@2.02
350 Yellow Jacket.....	1.01@1.01	180 New York.....	1.20@1.21

AFTERNOON SESSION.

455 Alps.....	6.3@6.3
300 Alta.....	6.3@6.3
1125 Argenta.....	30.40@30.40
95 Best & Belcher.....	2.22@2.23
300 Belcher.....	4.05@4.10
1200 Belle Isle.....	75c
250 Bullion.....	5.5@5.5
200 Bodie.....	11.0@11.0
405 Bechtel.....	7.1@7.1
300 Belcher.....	4.05@4.10
135 Con Virginia.....	2.22
110 Crown Point.....	5.4@5.5
615 DeFrees.....	3.0@3.05
300 Day.....	11.0@11.0
525 Endowment.....	70c
650 Eureka Con.....	3.7@3.71
95 Exchequer.....	3.1
250 El Dorado South.....	70c
200 Falcon.....	65c
120 Grand Prize.....	7.1@7.1
535 Gila.....	85.0@85.0
180 Gould & Curry.....	8.4@8.4
100 Hale & Nor.....	1.15@1.15
200 Horne.....	3.0c
950 Hunsley.....	1.05@1.10
750 Hamburg.....	3.30@3.30
50 Homestake.....	5.1
75 Justice.....	8.0
50 Leeds.....	1.9
235 Leopard.....	75c
35 Mexican.....	1.35
220 Modoc.....	55.0@55.0
235 Manhattan.....	10c
10 Northern Belle.....	9.1
130 Navajo.....	1.85@1.85
250 New Coso.....	50c
20 Ophir.....	5.0
140 Overman.....	1.4@1.41
200 Panthor.....	30.35@30.35
15 Raymond & Ely.....	4.1
80 Rye Patch.....	3.0
30 Star.....	6.0
150 Savage.....	10c
800 Silver Prize.....	65c
100 Sierra Nevada.....	4.30
1100 Tiptop.....	3.20@3.20
1100 Ward.....	3.25
2500 Young America.....	45c
160 Yellow Jacket.....	1.01@1.01
130 Andes.....	6.3@6.3
10 Alpha.....	1.3
775 Alps.....	3.1@3.14
300 Argenta.....	35.0@35.0

Saturday A. M. Mar. 9.

300 Argenta.....	35.0@35.0
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230 Silver Hill.....	21.0@21.0
300 Senator.....	3.40
600 Trojan.....	5.0
105 Utah.....	1.13@1.13
915 Union Con.....	5.0
1210 Ward.....	3.20
1100 Wells-Fargo.....	5c
400 Yellow Jacket.....	1.01@1.01
AFTERNOON SESSION.	
1200 Argenta.....	45.0@45.0
600 Alps.....	4.0@4.0
250 Andes.....	6.3@6.3
135 Alpha.....	1.10@1.10
380 Best & Belcher.....	21.0@21.1
200 Belmont.....	80c
200 Bodie.....	11.0@11.0
1650 El Dorado.....	85.0@85.0
200 Bullion.....	5.5
170 Bechtel.....	7.1@7.1
315 Belcher.....	4.0@4.0
115 California.....	3.1@3.1
300 Con Imperial.....	45.0@45.0
235 Caledonia.....	2.45@2.45
40 Chollar.....	3.3@3.3
535 Crown Point.....	5.1@5.1
1785 DeFrees.....	1.35
400 Day.....	11.0@11.0
1000 Eureka Con.....	3.7@3.7
305 Exchequer.....	3.5@3.5
250 Falcon.....	65c
2720 Grand Prize.....	7.1@7.1
500 Gila.....	75c
750 Gould & Curry.....	8.4@8.4
750 Hamburg.....	3.30
1405 Hussey.....	1.10@1.10
1200 Independent.....	1.1@1.1
245 Justice.....	8.0@8.0
900 Leeds.....	2.0@2.0
1150 Leopard.....	70.0@70.0
750 Modoc.....	70.0@70.0
165 Mexican.....	1.4@1.4
310 Manhattan.....	1.0@1.0
35 McCracken.....	2.40@2.45
305 Navajo.....	2.40@2.45
350 Northern Belle.....	1.15
70 Overman.....	1.4@1.4
195 Ophir.....	5.4@5.4
655 Panther.....	30.0@30.0
150 Raymond & Ely.....	4.0@4.0
100 Rye Patch.....	3.0
1300 Silver Prize.....	6.0@6.0
900 Star.....	2.0@2.0
125 Sierra Nevada.....	1.1@1.1
625 Sierra Nevada.....	4.15
150 Trojan.....	5.0
40 Union Con.....	45c
100 Utah.....	1.1
200 Ward.....	3.25
100 Wells-Fargo.....	5c
10 Yellow Jacket.....	1.01@1.01

Tuesday A. M. Mar. 12.	
640 Alta.....	6.1@6.1
285 Andes.....	6.3@6.3
50 Alpha.....	1.1
55 Belcher.....	4.0@4.0
620 Best & Belcher.....	2.1@2.1
1000 Bullion.....	5.5@5.5
220 Benton.....	65.0@65.0
75 Con Imperial.....	70.0@70.0
400 Crown Point.....	5.1@5.1
90 Chollar.....	3.4@3.4
1105 Con Virginia.....	2.4@2.4
1505 California.....	3.3@3.3
745 Caledonia.....	2.40@2.40
60 Confidence.....	60c
100 Dayton.....	10c
781 Exchequer.....	3.5@3.5
1880 Gould & Curry.....	8.4@8.4
100 Hale & Nor.....	1.10@1.10
300 Justice.....	8.0@8.0
925 Julia.....	2.40@2.45
90 Leviathan.....	35c
1055 Mexican.....	1.7@1.7
200 Monumental.....	1.0
450 New York.....	1.20@1.21
155 Overman.....	1.7@1.7
1780 Ophir.....	60.0@60.0
300 St. Louis.....	40c
355 Sierra Nevada.....	4.0@4.0
490 Savage.....	1.2@1.2
1250 Solid Silver.....	5.5@5.5
1300 Succor.....	2.0@2.0
300 Senator.....	3.40
25 Crown Point.....	2.5
10 Seg Belcher.....	27c
1275 Trojan.....	40c
2190 Union Con.....	70.0@70.0
175 Utah.....	1.15@1.15
240 Woodville.....	60c
2000 Wells-Fargo.....	10c
1435 Ward.....	10c
110 Yellow Jacket.....	1.01@1.01
660 Alps.....	3.2@3.2
280 Argenta.....	45.0@45.0
625 Alta.....	5.5@5.5
300 Belle Isle.....	60.0@60.0
500 Bodie.....	11.0@11.0
200 Bullion.....	5.5
550 Bechtel.....	6.0@6.0
200 Belmont.....	80c
400 Bodie.....	11.0@11.0
2260 Con Virginia.....	2.3@2.3
255 Caledonia.....	2.4@2.4
62 California.....	3.3@3.3
210 Chollar.....	3.4@3.4
240 Crown Point.....	5.1@5.1
60 DeFrees.....	1.35@1.35
540 Day.....	11.0@11.0
160 Eureka Con.....	3.7@3.7

SALES OF LAST WEEK AND THIS COMPARED.

THURSDAY A. M., Mar. 7.		Thursday A. M., Mar. 14.	
640 Alta.....	73.7@71	1050 Alta.....	4.0@41
145 Andes.....	6.5@6.70	150 Andes.....	6.5@6
300 Alpha.....	1.10@1.10	300 Alpha.....	1.10@1.10
380 Best & Belcher.....	23.1@22.3	380 Belcher.....	3.65@3.39
200 Belmont.....	80c	1515 Bullion.....	5.5@5
200 Bodie.....	11.0@11.0	890 Benton.....	6.0@6
1650 El Dorado.....	85.0@85.0	770 California.....	3.1@3.2
200 Bullion.....	5.5@5.6	1000 California.....	3.1@3.2
170 Bechtel.....	7.1@7.1	420 Crown Point.....	5.5@5.5
315 Belcher.....	4.0@4.0	75 Chollar.....	3.1
1150 California.....	3.1@3.1	325 Con Imperial.....	65.0@65.0
300 Con Imperial.....	45.0@45.0	325 Caledonia.....	2.4
235 Caledonia.....	2.45@2.45	500 Dayton.....	15.0@10
40 Chollar.....	3.3@3.3	505 Exchequer.....	3.45@3.40
535 Crown Point.....	5.1@5.1	460 Gould & Curry.....	8.4@8.5
1785 DeFrees.....	1.35@1.35	450 H&N.....	8.3@8.3
400 Day.....	11.0@11.0	510 Idaho.....	2.2@2.2
1000 Eureka Con.....	3.7@3.7	300 Justice.....	7.0@7.1
305 Exchequer.....	3.5@3.5	300 Mexican.....	1.3@1.4
250 Falcon.....	65c	1200 Monumental.....	5.0@10
2720 Grand Prize.....	7.1@7.1	350 Nevada.....	6.5@6
500 Gila.....	75c	200 New York.....	1.1
750 Gould & Curry.....	8.4@8.4	4095 Ophir.....	44.1@43.8
750 Hamburg.....	3.30@3.30	45 Overman.....	15.0@14.1
1405 Hussey.....	1.10@1.10	880 Savage.....	8.4@8.4
1200 Independent.....	1.1@1.1	510 Sierra Hill.....	1.1@1.1
245 Justice.....	8.0@8.0	580 Silver Nevada.....	4.1@4.2
900 Leeds.....	2.0@2.0	860 Silver Silver.....	5.5@5.4
1150 Leopard.....	70.0@70.0	700 Senator.....	3.0@3.2
750 Modoc.....	70.0@70.0	425 Sequoia.....	1.1
165 Mexican.....	1.4@1.4	510 Sierra Nevada.....	4.1@4.1
310 Manhattan.....	1.0@1.0	200 Trojan.....	5.0
35 McCracken.....	2.40@2.45	935 Union Con.....	6.0@6.1
305 Navajo.....	2.40@2.45	60 Utah.....	1.1
350 Northern Belle.....	1.15@1.15	1000 Wells-Fargo.....	10c
70 Overman.....	1.4@1.4	1000 Wells-Fargo.....	9.0@9.0
195 Ophir.....	5.4@5.4	100 Woodville.....	5.0
655 Panther.....	30.0@30.0	190 Yellow Jacket.....	9.0@9.1
150 Raymond & Ely.....	4.0@4.0		
100 Rye Patch.....	3.0@3.0		
1300 Silver Prize.....	6.0@6.0		
900 Star.....	2.0@2.0		
125 Sierra Nevada.....	1.1@1.1		
625 Sierra Nevada.....	4.15@4.15		
150 Trojan.....	5.0@5.0		
40 Union Con.....	45c		
100 Utah.....	1.1@1.1		
200 Ward.....	3.25@3.25		
100 Wells-Fargo.....	5c		
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Mining Share Market.

A state of don't and expectancy, with an undercurrent of feverish excitement, has characterized the Stock market for the past few days, a condition of things attributable to the uncertainty attending the reported ore developments in Ophir, the result of the Justico-Alta imbrolio, the near approach of the Sutro tunnel to the Comstock lode, and such minor events as serve always to keep the dealer in stocks on the qui vive. But with all these matters unsettled and inconsequential, there has been some improvement in prices with a growing confidence in the future of the business, the more hopeful and sanguine being now fully of the opinion that the traditional "Spring Rise" will not again be intermitted, as was the case last year. However this may be, the condition of the mines is in the aggregate healthful and promising. Many outside properties have lately come into active and profitable production, and there seems to be an impression in very authoritative quarters, that more than one important find is impending in the Comstock. The prospects in the Ophir are described in the Gold Hill News, of Wednesday last, as being of a very interesting and hopeful kind, the indications being that the ore body cut on the 1900 level will show great improvement on the 2000 level, about to be opened from the main incline. The hope of a coming bonanza here has, of course, favorably affected shares in the Mexican ground adjoining Ophir, on the north, besides giving strength to other claims in the vicinity.

Another encouraging feature of the situation at this great center of attraction is that on the 1630 level of Con. Virginia, the ore breasts going south instead of giving out as was expected, show a marked improvement in that direction, a circumstance that bears favorably on the prospects of Best & Belcher. The water burst that occurred last week in the Con. Virginia has subsided without inflicting permanent damage or causing serious trouble. Despite this bad condition of the roads, compelling the stoppage of several mills situate some distance from the mines and railroad, there will be no decrease of hulsion production, the services of the Mexican mill, with capacity equal to all of those stopped, having been secured by the Bonanza firm.

Better as it Is.

Some of the Colorado papers are deploring the fact that so little of the stock of their home mines has as yet been listed on the Exchange Boards of this and Eastern cities, believing, as they express it, that these shares should be so placed that they could be handled by all classes. This they affect to think would be of especial advantage to the men engaged at work in the mines, inasmuch as they have opportunities for getting points touching the condition of the same in advance of outsiders. This, it is argued, would more than offset the advantages that accrue to speculators and capitalists through adroit combinations and the use of money in all cases where stock is selling on merit. With this latter qualification, the above line of reasoning would be sound enough. But that is exactly the trouble. The price of shares is not always gauged by the merits of the mine; the reverse is oftener the case. Hence, the men working underground and conversant with the conditions and prospects of the mine, are more apt to be victimized by dabling in shares than anybody else. They naturally suppose that when the mine is looking well, the price of shares will go up and vice versa. Buying and selling on this untenable supposition, they are almost sure to get entrapped.

Almost every great strike on the Comstock has been attended with disaster to the miners working on that lode. This was eminently so in the case of the Consolidated Virginia development. Seeing with their own eyes the magnitude of the bonanza being uncovered there, they thought the shares of that mine not only to the extent of their ready means, but largely on credit, and this when prices were at their acme. The result was, they were nearly all ruined. A few months since a fine body of high grade ore was struck in the lower levels of the Star mine, Cherry Creek district, Nevada. Excited at what they saw, the men employed in the mine ordered purchases of the stock to be made here without limit as to price, which, under the stimulus of these orders, at once advanced from \$2 or \$3 to \$10 per share. Believing the development to be a valuable one, such combinations were formed here as soon brought prices down to the old figure and finally a good deal below it, a result that forced most of the miners who had so eagerly invested in this stock to sell out at a heavy loss. And so it will always be; the men who are hest acquainted with the actual condition of the mines will prove the greatest failures as stock speculators, their judgment and knowledge serving them but a poor purpose when pitted against the money of the capitalist and the wiles of the cunning manipulator. Let the Colorado journalists congratulate themselves and the community among whom their lot has been cast, that so few of their mines are represented on these stock exchange boards, rather than deplore this fortunate condition of things.

Chances for Work in the Mines.

EDITORS PRESS:—I believe it would be an easy matter to furnish profitable work for every man on this coast, if the proper plan were adopted. Let parties, who have money, strike out for some part of the mineral districts of the State, where there are known to be numerous quartz lodes, some of which have been fully or partially developed, enabling them to form some judgment as to their value. Having selected a lode that it is thought will pay, let these parties buy the same, and they can always be bought at a small fraction of their actual value. Having supplied this mine with a mill of suitable capacity, let them employ the idle men to run it and work the mine. If men having means will visit Siskiyou county, I will show them a number of gold-bearing quartz lodes of good promise, that can be bought at reasonable figures.

The farmers of Scott valley have taken up claims, and are developing them as fast as they can, with their limited means. As a general rule, they are willing to let men that have money for building mills and giving employment to the unemployed, take their mines on almost any terms they may choose to propose.

H. C. CORY.

Etna, Siskiyou Co., Cal., March 8th, 1878.

[We cheerfully make room for the above communication, and would be glad to receive letters of like purport from other sections of the country. These suggestions from practical men are valuable, and will always receive proper attention at our hands.]

We may remark in this connection that there appears to be a demand for good female help in Prescott, Arizona, where families are much in need of girls and women to do housework, the wages paid being not less than \$25 per month. We doubt not many of our women might greatly improve their condition pecuniarily by going to Arizona, but it would not be advisable for any but those having good health and robust constitutions to emigrate to that remote Territory, as the journey is a long and wearisome one, and a life there subjected to many discomforts. It is, however, a growing country, has a healthy climate, and would afford women having enough physical vigor to rough it more and better opportunities for getting ahead than any other country we know of. —EDITORS PRESS.]

WOODWARD'S GARDENS has the following new attractions: The buffalo chase; large whale skeleton; new museum; improvements in the zoological department, besides the other features which have made it popular.

Information Wanted.—Any information as to the whereabouts of Mr. John Donohue, who left Ireland for Idaho City, in April, 1876, will be thankfully received by a friend that is inquiring for him. Address P. O. Box 2361, San Francisco, Cal.

SETTLERS and others wishing good farming lands for sure crops, are referred to Mr. Edward Frisbie, of Anderson, Shasta County, Cal., who has some 15,000 acres for sale in the Upper Sacramento Valley. His advertisement appears from time to time in this paper.

MODEL MAKER AND MACHINIST.—I. A. Heald, No. 514 Commercial St., San Francisco, (fourth floor).

Signal Service Meteorological Report.

Week Ending March 12, 1878.

HIGHEST AND LOWEST BAROMETER.						
Mar. 6	Mar. 7	Mar. 8	Mar. 9	Mar. 10	Mar. 11	Mar. 12
30.14	30.27	30.36	30.29	30.12	30.05	30.04
30.04	30.16	30.31	30.21	30.06	30.03	29.98
MINIMUM AND MAXIMUM THERMOMETER.						
59	55	58	59	60	59	60
51	47	48	48	50	50	49
MEAN DAILY HUMIDITY.						
85	63	60	74	77	77	77
PREVAILING WIND.						
SW	NW	N	SW	N	W	SW
WIND—MILES TRAVELED.						
223	262	208	121	200	149	183
STATE OF WEATHER.						
Fair.	Clear.	Clear.	Fair.	Fair.	Fair.	Fair.
RAINFALL IN TWENTY-FOUR HOURS.						
1.01	.07			.07		
Total rain during the season, from July 1, 1877, 31.24 in.						

LEATHER.

[WHOLESALE.]

WEDNESDAY M., March 13, 1878.

Sole Leather, heavy, lb.	26 @ 29
Light, do.	22 @ 24
Jodot, 8 Kil. doz.	48 @ 50
11 to 13 Kil. do.	50 @ 52
14 to 19 Kil. do.	50 @ 52
Second Choice, 11 to 13 Kil.	55 @ 60
Cornellian, 12 to 13 Kil.	57 @ 60
Females, 12 to 13 Kil.	63 @ 67
For Linings, do.	69 @ 70
Simon Ulmo, Females, 12 to 13 Kil.	58 @ 62
14 to 15 Kil.	66 @ 70
16 to 17 Kil.	72 @ 74
Simon, 18 Kil.	70 @ 74
20 Kil.	65 @ 67
24 Kil.	72 @ 74
Robert Calif. 7 and 9 Kil.	35 @ 40
Kips, French, lb.	40 @ 45
French Sheep, all colors.	8 @ 10
Eastern Calf for Backs, lb.	1 @ 1.25
Sheep Roams for Topping, all colors, doz.	9 @ 13
For Linings, do.	61 @ 63
Cal. Russel Sheep Linings.	1.75 @ 4.50
Boot Legs, French Calf, pair.	4 @ 5
Good French Calf.	4 @ 4.75
Best Jodot Calif.	5 @ 5.25
Leather, Harness, lb.	1.00 @ 1.25
Fair Bridle, doz.	43 @ 62
Siding, lb.	33 @ 37
Wet, doz.	30 @ 35
Buff, ft.	12 @ 20
Wax Side.	17 @ 18

METALS.

[WHOLESALE.]

WEDNESDAY, M., March 13, 1878.

IRON—	
American Pig, ton.	28 00 @ 30 00
White Pig, ton.	28 00 @ 30 00
Oregon Pig, ton.	28 00 @ 30 00
Refined Bar.	21 @ 34
Horse Shoes, keg.	5 00 @ 5 75
Nail Rod.	— @ 7 75
Norway, Oval.	— @ 7 75
COPPER—	
Sheathing, lb.	34 @ 35
Sheathing, Yellow.	21 @
Sheathing, Old Yellow.	12 @
Composition Nails.	24 @
Composition Bolts.	24 @
STEEL—	
English Cast, lb.	13 @ 14
Anderson & Wood, ordinary sizes.	15 @
Drill.	15 @
Flat Bar.	14 @ 19
Flow Steel.	8 1/2 @ 12 1/2
TIN PLATES—	
10x14 C. Charcoal.	7 50 @ 8 50
Banca Tin.	23 @ 24
Australian.	17 @ 17 1/2
ZINC—	
By the Cask.	9 @
Zinc Sheet 7 1/2 ft. 7 to 10, lb.	9 @ 10
7 1/2 ft. 11 to 14.	10 @
8 1/2 ft. 8 to 10.	11 @
8 1/2 ft. 11 to 10.	11 @
NAILS—	
Assorted sizes.	3 15 @ 3 25
QUICKSILVER—	
By the lb.	43 @ 45

GENERAL MERCHANDISE.

[WHOLESALE.]

WEDNESDAY M., March 13, 1878.

BAGS—Jobbing.	
Eng. Standard Wheat, 10 1/2 @ 11	
Neville & Co's.	
Hand Sewed, 22x36, 10 1/2 @ 11	
24x36.	
Machine Swd, 22x36, 10 1/2 @ 11	
Flour Sacks, halves.	8 1/2 @ 9
Quarters.	5 1/2 @ 6 1/2
Eighths.	4 @ 4 1/2
Heaven, 60 inch.	9 @
45 inch.	9 @
40 inch.	9 @
Wool Sacks.	
Hand Sewed, 3 1/2 lb. 47 @ 50	
4 lb. do.	52 @
Machine Sewed.	47 @
Standard Gunnies.	14 @ 15
Bean Bags.	6 1/2 @ 8
CANDLES.	
Crytal Wax.	17 @ 17 1/2
Eagle.	14 @
Patent Sperm.	30 @ 34
CANED GOODS.	
Assorted Pie Fruits.	
2 lb. cans.	2 @ 23
Table do.	3 1/2 @ 25
Jams and Jellies.	1 25 @
Pickles, 1/2 gal.	3 50 @
Sardines, or box.	1 65 @ 1 90
H. B. B. B.	3 00 @
Preserved.	
2 lb. doz.	4 00 @
do Beef, 4 lb. doz.	6 50 @
Preserved Mutton.	
2 lb. doz.	4 00 @
Beef Tongue.	6 50 @
Preserved Ham.	
2 lb. doz.	6 50 @
Deviled Ham, 1 lb.	50 @
do Ham, 1/2 doz.	3 00 @
COAL—Jobbing.	
Australian, ton.	7 75 @ 8 00
do do.	7 50 @ 7 80
Bellingham Bay.	6 50 @
Seattle.	7 00 @
Cumberland.	14 00 @
Mt. Diablo.	4 75 @ 6 75
Lehigh.	12 00 @
Liverpool.	7 00 @ 8 00
West Hartley.	7 50 @ 8 00
Scott.	7 00 @ 8 00
Others.	12 00 @ 16 00
Yankee.	7 50 @
Charcoal, sacks.	75 @
Coke, 1/2 lb.	60 @
COFFEE.	
Sandwich Id. lb.	21 @
Costa Rica.	19 @
Guatemala.	19 @
Java.	25 @
Manila.	19 @ 19 1/2
Ground, in cans.	25 @
ESL.	
Sac to Dry Cod.	5 @ 6
do in cans.	6 1/2 @ 7
Eastern Cod.	7 1/2 @
Salmon, blks.	9 00 @ 10 00
H. H. bls.	5 25 @ 6 00
2 lb. cans.	3 10 @ 3 15
Pkld Cod, bls.	22 00 @
H. H. bls.	11 00 @
Mackerel, No. 1.	
H. H. bls.	10 50 @ 11 00
In Kits.	3 00 @
Ex Mess.	3 50 @ 4 50
Pkld Herring, bx 3 00 @ 3 50	
Boston Smoked Hg.	40 @ 50
For Linings.	
Lime, Sta Cruz, etc.	
hbl.	2 00 @ 2 25
Cement, Rosen-	
dale.	2 75 @ 3 50
Portland.	4 75 @ 5 50

PAINTS.	
Pure White Lead.	9 1/2 @ 10 1/2
Whiting.	14 @
Putty.	4 @ 5
Chalk.	13 @
Paris White.	24 @
Ochre.	31 @
Venician Red.	31 @
Averill Mixed.	
Paint, gal.	
White & tins.	2 00 @ 2 40
Green, Blue & C.	
Ch Yellow.	3 00 @ 3 50
Light Red.	3 00 @ 3 50
Metallic Roof.	1 30 @ 1 60
RICE.	
China No. 1, lb.	6 @ 6 1/2
Bawian.	5 @ 5 1/2
SALT.	
Cal. Bay, ton.	15 00 @ 22 50
Common.	10 00 @ 12 00
Carmen Id.	13 00 @ 22 50
Liverpool fine.	20 00 @ 22 50
SOAP.	
Castle, lb.	10 @ 10 1/2
Common brands.	4 1/2 @ 6
Fancy brands.	7 @ 8
SPICES.	
Cloves, lb.	45 @ 50
Cassia.	22 @ 25
Nutmegs.	85 @ 90
Pepper Grain.	15 @ 17
Pimento.	15 @ 16
Mustard, Cal.	
1 lb glass.	1 50 @
SUGAR, ETC.	
Cal. Cube, lb.	11 @
Powdered.	12 @
Cassia.	11 @
Granulated.	11 @
Golden C.	9 1/2 @
Cal. Syrup, kgs.	70 @
Hawaiian Molasses.	26 @ 30
TEA.	
Young Hyson.	
Moynie, etc.	35 @ 60
Country pkld Gun-	
powder & Im-	
pact.	50 @ 60
Hyson.	30 @ 35
Foco-Chow O.	35 @ 60
Japan, 1st quality.	40 @ 60
2d quality.	25 @ 35

Gold, Legal Tenders, Exchange, Etc.	
[Corrected Weekly by SUTRO & Co.]	
SAN FRANCISCO, March 13, 3 P. M.	
LEGAL TENDERS IN S. F., 11 A. M., 98 @ 99 1/2. SILVER, 2.75 @	
3. GOLD IN NEW YORK, 101.	
GOLD BARS, 800 @ 910. SILVER BARS, 82 @ 85 cent. dis-	
count.	
EXCHANGE ON NEW YORK, 1 1/2; on London bankers, 49 1/2	
Commercial, 50; Paris, 4 1/2 francs @ dollar; Mexican	
dollars, 95.	
LONDON Consols 95 7/16; Bonds, 105 1/2.	
QUOTATIONS IN S. F., by the bank, 1/2 lb, 46 @ 47 1/2.	

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Iron and Machine Works.

ST. HENRY S. SMITH

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

OF ALL KINDS.

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PHELPS MANUFACTURING COMPANY,

Manufacturers of all kinds of

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ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

13, 15 & 17 Drumm St., near California,

SAN FRANCISCO, CAL.

SACRAMENTO BOILER WORKS,

37 Fremont St., cor. Mission, S. F.

HALL & KELSHAW,

PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the lowest possible terms.

GOLDEN STATE & MINERS' IRON WORKS.

Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

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UNION IRON WORKS, SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills' Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets, SACRAMENTO, CAL.

CALIFORNIA BRASS FOUNDRY,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE. J. H. WOOD. V. KINGWELL.

California Machine Works, 119 BEALE STREET, SAN FRANCISCO.

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Builders of QUARTZ, SAW AND FLOUR MILLS

Keating's Sack Printing Pressees,

THE ECONOMY HYDRAULIC HOIST FOR STORES, AND GENERAL MACHINISTS.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

J. HENDY, 49 and 51 Fremont Street, S. F.

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THOMPSON BROTHERS, EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

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Attorney and Counsellor at Law, PATENT LAW A SPECIALTY.

OFFICE—320 Sansome Street, Halleck's Block, San Francisco.

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Manufacturers of

IMPROVED PORTABLE

Hoisting Engines,

For Mining and Other Purposes.

Steam Engines and all Kinds of Mill and Mining Machinery.

Pacific Rolling Mill Co.,

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MANUFACTURERS OF

RAILROAD AND MERCHANT IRON,

ROLLED BEAMS, ANGLE, CHANNEL AND T IRON, BRIDGE AND MACHINE BOLTS, LAG SCREWS, NUTS, WASHERS, ETC., STEAMBOAT SHAFTS, CRANKS, PISTONS, CONNECTING RODS, ETC., ETC.

Car and Locomotive Axles and Frames, and Hammered Iron of Every Description.

HIGHEST PRICE PAID FOR SCRAP IRON.

Orders Solicited and Promptly Executed.

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Fulton Iron Works.

Hinckley, Spiers & Hayes.

(ESTABLISHED IN 1855.)

Works, Fremont and Howard St. | San Francisco, Cal | Office, No. 213 Fremont St.

MANUFACTURERS OF

Marine Engines and Boilers,

Propeller Engines either High Pressure or Compound Stern or Side Wheel Engines.

Mining Machinery

Hoisting Engines and Works, Cages, Ore Buckets, Ore Cars, Pumping Engines and Pumps, Water Buckets, Pump Columns, Air Compressors, Air Receivers, Air Pipes.

Mill Machinery.

Batteries for Dry or Wet Crushing, Amalgamating

Engines and Boilers

of all kinds, either for use on Steamboats and made in accordance with the Act of Congress regulating the same, or for use on land. Water Pipe, Pump or Air Column, Fish Tanks for Salmon Canneries of every description.

Boiler repairs promptly attended and at very moderate rates.

Pans, Settlers, Furnaces, Retorts, Concentrators, Ore Feeders, Rock Breakers, Furnaces for Reducing Ore, Water Jackets, Etc.

Sugar Machinery.

Crushing Rolls, Clarifiers, Vacuum Pans, Air Pumps, Concentrators, Bag Filters, Charcoal Filters, Blow-up Tanks, Coolers and Receiving Tanks.

Miscellaneous Machinery.

Flour Mill Machinery, Saw Mill Engines and Boilers, Dredging Machinery, Oil Well Retorts, Powder Mill Machinery, Water Wheels.

PACIFIC IRON WORKS,

First and Fremont Streets, between Mission and Howard, San Francisco, Cal.,

RANKIN, BRAYTON & CO.,

MANUFACTURERS OF

ENGINES, BOILERS, MARINE AND STATIONARY. PUMPING, HOISTING AND MINING MACHINERY

INCLUDING BATTERIES, AMALGAMATING PANS AND SETTLERS, CONCENTRATORS, ORE FEEDERS,

CRUSHING ROLLS AND ROCK BREAKERS, ALSO, WATER JACKET SMELTING FURNACES,

FOR REDUCING LEAD, SILVER AND COPPER ORES, QUICKSILVER FURNACES,

RETORTS AND CONDENSERS, ROASTING AND CHLORIDIZING FURNACES,

SUOAR MILL MACHINERY, WATER WHEELS, Etc., ALL OF THE

LATEST AND MOST IMPROVED CONSTRUCTION.

Agents for the Allen Engine Governor, Cooke Boiler Feeder and Heater, Buckminster

Rock Drills and Air Compressors, Wheeler's Ore Breaker, Etc.

GEO. W. FOGG, Supt.

George Spaulding.

Harrison Barto.

Solon H. Williams.

SPAULDING, BARTO & CO.



No. 414 CLAY STREET,

North Side,
Above Battery,

San Francisco.

FRASER, CHALMERS & CO.
SUCCESSORS TO EAGLE WORKS MFG CO. MANUFACTURERS OF

STEAM ENGINES, BOILERS, AND STAMP MILLS
CRUSHING ROLLERS, AMALGAMATING MACHINERY
FOR SYSTEMATIC MILLING, SMELTING, AND CONCENTRATION OF ORES

AGENTS FOR
BLAKE STONE BREAKER
JEFFEL & WATER WHEEL
FLOUR MILL FURNISHING CHICAGO.
ROASTING CYLINDERS
GENERAL MACHINERY

GOLD, SILVER AND COPPER MINING,
Reducing and Concentration Machinery.

Hoisting Engines, Diamond Pointed Rock Drills,
Manufactured by M. C. RULLOCK.

Address, FRASER, CHALMERS & CO., Chicago, Ill.

Machinery.

The Ingersoll Rock Drill



Mines Using these Drills on the Comstock Lode—Virginia City, Nevada:

Con. Virginia M. Co.,
California M. Co.,
C & O Shaft,
Utah M. Co.,
Ophir M. Co.,
Mexican M. Co.,
Overman M. Co.,
Bullion M. Co.,
Con. Imperial M. Co.,
Gould & Curry M. Co.,

Best & Belcher M. Co.,
Crown Point M. Co.,
Belcher M. Co.,
Yellow Jacket M. Co.,
Sierra Nevada M. Co.,
Prospect M. Co.,
Baltimore Con. M. Co.,
Silver Hill M. Co.,
Dayton M. Co.,
Sutro Tunnel Co.

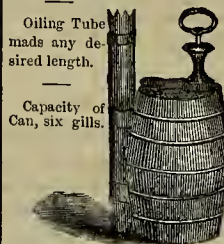
J. B. REYNOLDS,

320 Sansome Street.

MORTON OIL PUMP!

NEAT AND SAVES TIME AND OIL.

THE ONLY ABSOLUTELY SAFE OILER.



By the simple pressure on the valve, the oil is delivered in the exact quantity desired, (from one drop to a spoonful) exactly on the bearing, with no possibility of clogging. In ordinary factories the saving will pay for the oil in 60 days. Send for Circular.

Morton Oiler Co.
Biddeford, Me.

THE O'HARRA CHLORIDIZING FURNACE.

This furnace is guaranteed to chloridize from 88 per cent. to 95 per cent. of the silver, and put gold in a state so that 88 to 95 per cent. of the battery assay can be obtained by amalgamation on any gold or silver ore ever formed by nature.

The cost of Roasting and Chloridizing is as follows:
One man, per day.....\$ 3 50
One man, per day.....3 00
Wood, 14 cords at \$3.....7 00

Cost of 20 tons.....\$13 50
Cost of one ton.....67 1/2

In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

Several furnaces are in successful operation in California, Nevada and Idaho.

Any persons wishing any reference can address:

JUDOE W. WEBSTER, Paymaster Mine, Reno, Nev.
LEWIS CHALMERS, Manager Eschequer and IXL Mines, Silver Mountain, Cal.
J. S. COPE, Vice-President Tehama County Bank, Red Bluff, Cal.
R. H. CAMPBELL, Superintendent Afterthought Mine, Redding; Shasta County, Cal.

For further information, apply to

D. J. O'HARRA, Reno, Nevada.

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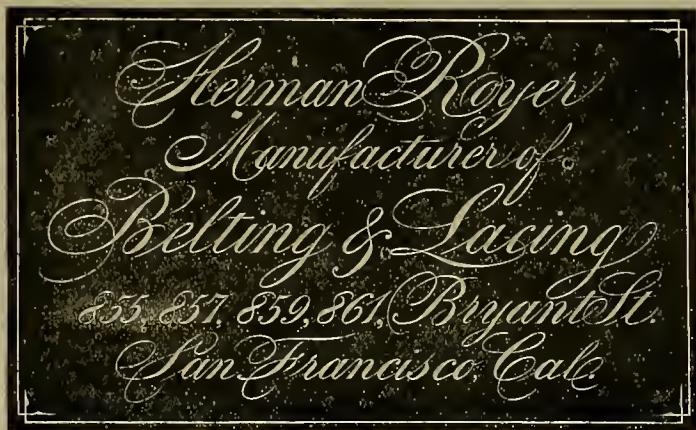
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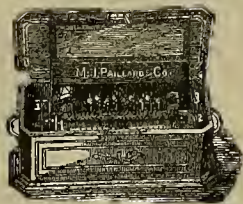
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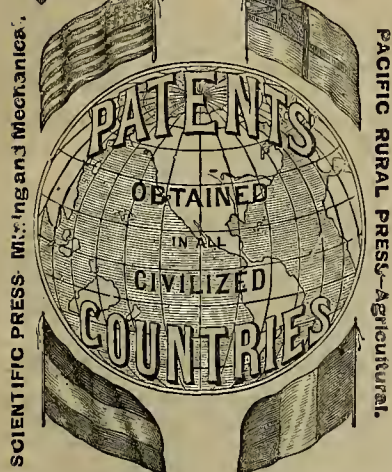
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SAN FRANCISCO, SATURDAY, MARCH 23, 1878.

VOLUME XXXVI.
Number 12.

Better Go Slow.

There are many folk in this fast going age who would do well to give heed to the above admonition; we being nearly all, in fact, too much disposed just now to hurry, jam and rush things. But the people for whom this caution is more especially intended are those who contemplate journeying, or who have already journeyed, to remote localities, as the Black Hills, for instance, or to localities less remote, as the Bodie and Esmeralda districts, where indications betoken the re-enactment of one of our old Frazier river, White Pine and Panamint mining fiascos. Doubtless they have in the Black Hills a great deal of low grade ore that can be mined and milled, so long as the workings are confined to the surface, with a fair margin for profit. So we had at the start in many of the quartz districts of California, and so they had in the beginning over in Colorado and Montana. Such, in short, they have had at the outset in almost all quartz mining countries; and it is those fine surface indications that have played the mischief all over the country, they having proved the rocks on which so many pioneer investors have made financial shipwreck. Trusting that these opulent and tractable top ores would prove equally rich and docile in depth, everything connected with the business of their extraction and reduction was projected on a grand and costly scale. For a time, and so long as operations were confined to these surface ores, all was bonanza. But as soon as the line of permanent water had been reached, bringing in with it the highly sulphureted and otherwise troublesome ores, a new, and in most cases, fatal difficulty presented itself; and one that, with all our efforts and new processes, we have not yet been able to wholly overcome.

To go back to the very beginning of this industry on the Pacific coast, we find that it was this vexatious matter that first brought quartz mining at Grass Valley, the locality of its inception, to an almost dead halt, after it had been prosecuted for a number of years with fair success. In Placer and El Dorado counties this trouble repeated itself, and again in Kern county in a still more emphatic way; the quartz miners about Havilah who prospered exceedingly until they had worked their lodes to a depth of about 100 feet, having at that level been compelled to cease work almost entirely, and not that their ores had grown poorer, or at all diminished, but simply because they could no longer extract the gold from them by the methods then within reach.

These are cases where defeat came through the increased difficulty of working the ores and not through their diminution or impoverishment, to which latter cause a great many failures are also attributable. Esmeralda, White Pine and Panamint furnish notable examples. Like Bodie, these had each their rich ore bodies at the start, but they all went out at a little greater depths than have now been reached in the Standard, the paragon mine of Bodie. At Aurora, in the Esmeralda district, there were not less than a dozen lodes that for the first 300 feet yielded equally as good ores as the Standard. At about this level they petered, the town, the district and the whole country soon after following suit. At White Pine the ores in two or three mines were of the richest kind, and so at Panamint, Pine Grove, Schell Creek and at a hundred other camps throughout the mountains of Nevada, Utah and the vast mining regions of the interior, which had just enough of these rich surface ores to allure investments, but not enough to make them profitable and save the investors from ruin. Millions upon millions of the hard earnings of the people, both here and elsewhere, have been lost, simply because experts and prospectors, dazed by those rich superficial deposits, have advised this sort of premature expenditure.

It is certainly time that we should turn our hard experience to more profitable account and learn to go slow. This is what we have got to come to before permanent success can be assured. Colorado, like Black Hills, went off on a keen jump. She made her first heat at a 2:40 pace and then began to lag, coming at last to an almost dead

halt, a gait she was forced to keep for a number of years. During this season of dullness and depression, her miners learned wisdom—learned to go slow and do their work better, an experience that is at last telling with good effect on all her leading interests. The same has been the case to a greater or less extent with Utah and the other countries mentioned.

In view of the disasters that have attended these precipitate investments, we have almost fallen into the heresy that it would be better if capitalists were to leave these pioneer mining countries to take care of themselves. That people of small means ought to be more cautious about adventuring them in this uncertain field, is clearly true. If this class desire to avail themselves of the advantages attendant upon legitimate mining, it would be better to form small companies, and keep one or two capable prospectors constantly in the field, after the manner suggested in the PRESS a week or two since, selecting Arizona as the theater of their operations.

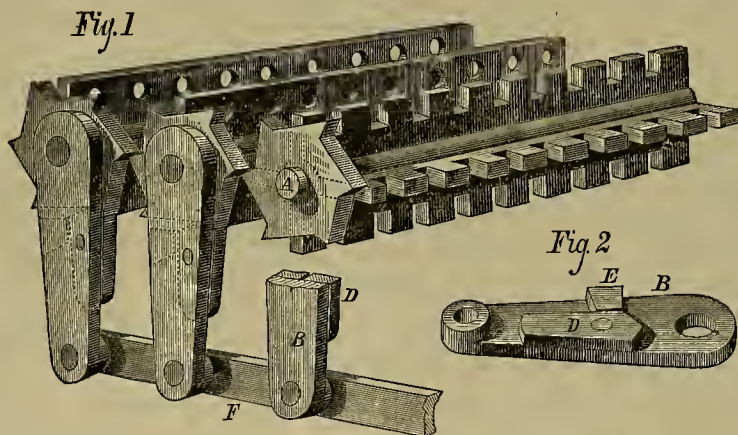
It is not, of course, our purpose to discourage prospecting elsewhere, nor yet to inveigh against the expenditure of money in opening up and equipping mines, whether it be in Bodie, the Black Hills, or wherever else sufficient inducements may offer for doing so. But, it being one of the infirmities of our people to go too fast at first, and having already suffered so severely from overhaste in mining matters, a caution against this precipitate action, and the

An Improved Rotary Grate Bar.

The new grate bar illustrated herewith, is claimed to be adapted for burning any kind of fuel with but little loss, to be durable, easily managed and easily cleaned. Each bar consists of an axis, *A*, Fig. 1, from which wings or lugs radiate. In the wings or slots or bores, as shown in the illustration, which are so arranged that the apertures do not come opposite each other, so that the fuel that falls from the wings of one bar is caught by the wings of the adjoining bar, without stopping up the air passages. If preferred, the wings may be left solid.

The shafts of the bars project, and upon said shafts the bars work freely. The levers, *B*, Fig. 2, fit over the ends of the shafts; and attached to the bars, and just inside the levers, are ratchet wheels, *C*, having six teeth. A pawl, *D*, on each lever, engages with these teeth and give the bar an intermittent rotary motion when the lever is oscillated back and forth. The lug, *E*, on the lever acts as a support to the pawl and receives the thrust. The connecting bar, *F*, unites all the levers and extends back to the boiler room where it is attached to an upright hand lever.

These bars are placed in furnaces in various ways. When the furnace is constructed with a



DENNY & RUTH'S PATENT ROTARY GRATE BAR.

repetition of these hurtful mistakes, seems just now proper and timely.

MR. JOSEPH WASSON, well-known from his connections with journalism on this coast, left this week for Bodie and Esmeralda. Mr. Wasson will act as agent for the MINING AND SCIENTIFIC PRESS while in these camps, and proposes writing a series of letters from there for the PRESS, which will be of value to all interested either in Bodie or Esmeralda. Both of these districts have lately become imbued with new life and will attract great attention this spring, numbers of miners having already gone there, and some considerable capital being invested. We trust that our friends will assist Mr. Wasson in obtaining all the information possible concerning the country he visits, and also that they will lend their influence in increasing the subscription list of the PRESS.

CALIFORNIA FRESH FISH ABROAD.—An English paper thus comments upon a Pacific coast enterprise: Fresh salmon, packed in ice, having reached Sydney and other Australian ports from San Francisco in a perfect state of preservation, the experiment will shortly be tried of sending salmon in a similar way to the English markets. The British public will then have an opportunity of eating excellent salmon at about fourpence per pound, the present price of codfish in London.

THE United States is the only country that shows an increase in both exports and imports for the past year.

view to their use, a long narrow opening may be left in front underneath the furnace doors, and at the back end of the furnace a support is placed, provided with holes a proper distance apart to receive one end of each bar. After the bars have been placed in position, a similar support can be slipped on over the front ends of the bars, thus securing them firmly in their places and closing up the opening. The bars thus placed cannot be moved out of position and can be readily inspected. In the case of a locomotive or portable engine furnace, the supports may rest on projections on the inside of the fire-box, or be bolted on the lower edge of the same. When used on locomotives a lever extending up into the cab enables the fireman to operate the bars to clear the fire or to dump the entire contents of the furnace.

The rotary motion of the bars, it is claimed, breaks up and discharges all clinkers and dross by crushing them between the lugs or wings. By continuing the rotary motion the grate becomes, in effect, a dumping grate, and the whole contents of the furnace can be discharged.

The bars being set so that the wings or lugs overlap to a greater or less extent, as may be desired, they form a continuous fuel table, so that finely divided coal, sawdust, tanbark, etc., can be burnt, as it is almost impossible for it to pass through without being caught by the lugs or wings on the adjoining bars. Those desiring further information can address Denny & Ruth, Circleville, Ohio.

THE annual consumption of sugar in this country is about 1,900,000,000 pounds, the revenue from which amounts to \$16,000,000 annually.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

WATCHMAKERS' OIL CUP.—Eugene R. Weber, S. F. The improvement consists in attaching the lid or cover to the cup by a spring, so that the cover may be easily slipped on or off by a simple movement of the thumb and finger. When it is desired to remove the cover to reach the oil, the operation will be as follows: The cup stands on the bench, with its front towards the workman, who, with his thumb and third finger at the base of the cup, holds it, while the forefinger slips the cover off to the back side of the cup, where it is held by a spring which holds the cover constantly against the cup and in connection with it. When it is desired to replace the cover, the operation is the same; the spring, with a slight touch on the cover with the forefinger, throwing the cover securely in place. The advantages of this invention will be readily seen by all familiar with the uses of a watchmaker's oil cup. The oil must be kept absolutely free from dust and dirt in order to be suitable for use, and with the ordinary form of lid, which is easily knocked off the cup and is very apt to be mislaid and lost, the oil is frequently rendered unfit for use. By this invention these objections are entirely overcome, as the lid is always attached to the cup.

CAR TRUCKS.—James D. Divoll, S. F. The improved construction of car trucks relates more particularly to an arrangement of divided axles and a novel method of mounting the axles, so that the car wheels can adapt themselves to the curves of the tracks. The invention contemplates the employment of a separate short axle for each wheel. The outer end of each short axle is mounted on a bearing, which is capable of a slight horizontal rotation, while the inner end is mounted on a swinging-hox or bearing, which is constructed with a swinging frame midway between the wheels. This swinging-box is attached to the frame by a movable fastening below the axle and an arrangement is applied which connects the upper ends of all four hoxes of each truck, so that they can swing in opposite directions when it is desired to adapt the wheels to the curve of the tracks.

HANDLE FOR BOXES.—R. E. Mowrey, S. F. This patent covers the application of peculiar flexible handles to that class of boxes, in which strawberries and other small fruit is packed in drawers for transportation. The rope of which the handle is made, is covered with leather to protect it. Two holes are bored in each end of the hox, through which the ends of the rope are passed. A countersink is made around these holes on the inside of the box, and on it the ropes are secured, leaving the inside surface smooth. An inclined groove is then cut downward from these holes on the outside of the hox, in which the handle lies when not in use. A wooden strip is placed across the outside of the box, just above the holes, so that when the handle is grasped and pulled upward, it will strike the edges of the strip and protect the knuckles.

PURIFYING COAL.—P. F. Morey, Oakland. The invention relates to a novel process, by which coals may be purified at small expense, and all impurities separated, so as to produce a high grade of coal from an impure and nearly worthless article. It consists in the employment of a bath of liquid, having such a density and composition, that, when the coal is introduced, it will be separated from its impurities, partly by mechanical means and partly by chemical.

IMPROVED ANCHOR.—E. and R. R. Spedden, Astoria, Oregon. This novel method of constructing ships' anchors consists in pivoting or hinging a single fluke in a peculiarly-constructed frame or shank. This shank, on account of its peculiar shape, serves both as a shank and stock and is devoid of any projecting arms or points, to come in contact with the ship's sides or bottom when it is being taken up, or to entangle the cable or chain so as to foul the anchor when it is on the bottom.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents—Eds.

Oro Blanco Mining District.

EDITORS PRESS:—In compliance with your request, I hereby send you a brief description of the above-named district, and some of the principal mines that are being prospected in it. The district is bounded on the north and west by the Arivaca mining district, on the east by the Santa Cruz valley, and on the south by the State of Sonora, Mexico. The mines, so far as known, are comprised within an area of 10 miles square, and are about 75 miles south of Tucson. The veins are large and generally well defined. The formation is porphyritic, the brown and gray varieties predominating. There are also belts of syenite gneiss and greenstone traversing the district, and in some few places, small veins of mountain limestone of a dark, bluish gray variety are seen. The ores are of almost every variety. Carbonate of lead containing from 10 to 500 dollars per ton in silver, and from 15% to 60% in lead; argentiferous galena, chloride of silver, black and gray sulphurets of silver, and blue and green carbonate of copper, containing from 25 to 300 dollars per ton in silver; and I have also found some copper glance very rich in silver. This comprises in brief the character of the predominating ores on or near the surface.

To be more particular, and to give you a better idea of the mines of this district, I will give you a brief description of a few of the best prospected veins here, beginning with the mine known as the Alaska. This mine lies about 12 miles south of the Old Heintzleman mine; the vein runs nearly north and south, and dips to the east. It varies in width from 10 to over 100 feet. This vein is in a grayish-brown porphyry. It is extremely well defined, and shows metal on the surface, from nearly 2,000 feet in length. The metal is chloride of silver, containing a small percentage of copper, not enough to be of any disadvantage in the practical working of the ores. There is a shaft sunk on this vein near the center of the Alaska claim to the depth of 81 feet. At the depth of 40 feet a cut was run across the ledge, showing it to be 20 feet from wall to wall. Next to the hanging wall a body of ore was cut through, exposing over six feet of metal. An assay was taken of every class of ore as it came out, with the following result: No. 1, first metal encountered, \$62.20 per ton of 2,000; No. 2, \$405.27; No. 3, \$721.95; No. 4, \$292.17; No. 5, \$522.14; No. 6, \$188.50; No. 7, \$1,460.87; No. 8, from the gouge next the hanging wall, \$37.70, making an average of \$461.35 per ton. At the depth of 80 feet, the vein was cut again, and found to be 22 feet between the walls. The metal streak on this level is fully 10 feet in width, and assays from \$25 to \$376.50 per ton. This mine has every indication of great wealth and permanency. There is another mine belonging to the same company that owns the Alaska, running nearly parallel with Alaska, and about 500 yards distant. This mine is known as the Wyoming. A shaft has been sunk on this vein over 30 feet. The ore is of the same character as the Alaska. The vein is large and well defined, pitching to the west; assays from this lode run from \$30.25 up to \$1,272.44. These mines are very accessible, there being a good wagon road from the mines to Tucson. About five miles from the above described mines, in a southeasterly direction, the same company own three other mines, known as the Montana group of mines; they are within three-fourths of a mile of each other. They are called the Montana, the Idaho, and the Mary Ann. The Montana is a very large, well defined lode, from 20 to 80 feet in width, carrying metal on the surface for 1,100 feet. The metal streak is from 6 to 30 feet wide. The ore is carbonate of lead, and from the surface in 12 assays gave an average of \$54.34 per ton in silver, with 41% of lead. A cut was made across the ledge where it was over 30 feet in width, showing metal from wall to wall. Near the center of this cut a tunnel was run in lengthwise of the lead a distance of over 50 feet, all the way in metal. I give below a list of seven assays, made from every grade of ore from the face of the tunnel at the depth of 40 feet: No. 1 gives \$250.70; No. 2, \$678.60; No. 3, \$37.70; No. 4, \$71.63; No. 5, \$82.94; No. 6, \$45.12; No. 7, \$34.93, giving an average of \$171.94 per ton. This mine shows near the surface the largest body of low grade ore of any mine I have seen in the Territory; it seems to be all metal. This vein runs nearly east and west and dips to the north. It can be traced for over six miles in length. The wall rock is gray porphyry and syenite. To the west of the Montana a few hundred yards is the Mary Ann. This vein has a parallel direction with the Montana, is from 3 to 10 feet in width, showing metal at the prospect hole that gave an average assay of ore of \$200 per ton. It is in the same formation as the Montana. Three-fourths of a mile north of the Mary Ann is the Idaho. This is another well defined lode, running in a northeasterly and southwesterly direction. The vein is from 6 to 10 feet wide, and can be traced distinctly for over 1,500 feet. There is a shaft sunk on this mine over 60 feet, showing a continuous vein of metal the whole depth. The ore is of the same class as the Montana and Mary Ann, and the average of the assays are about the

same, although some very rich ore has been found in this mine, but in small quantities. Some assays have gone over \$9,000 per ton. From what experience I have had down in Mexico, during six years' residence in mines located in a similar formation to this in which the above described mines are located, I think that I am safe in saying that when greater depth is attained the ore will increase in richness very fast. They are the finest prospects that I have ever seen in any country, for the amount of work done to show them up. About four miles in a southwesterly direction from the Montana group of ledges is another series of ledges, known as the Warsaw group. These ledges are mostly yellow carbonate of lead; ledges carrying quite a percentage of silver. The Warsaw lead, from which the group takes its name, was located last March. Considerable work has been done on this lode. There are three distinct ledges, running parallel, within the limits of the Warsaw location. All of them are sufficiently developed to show good pay ore and plenty of it. A shaft has been sunk on the main lead, or center lode, over 30 feet in depth, and the owners are still sinking the shaft deeper. The lode at this point is nearly vertical, and about eight feet wide. Over one-half the shaft is metal that assays from \$18.65 to \$614.93 in silver and about \$6 per ton in gold. An opening has been made near the southeast corner of the claim, on the easterly vein, to the depth of 40 feet, and about 40 tons of ore taken out that assays from \$15.50 to over \$1,000 per ton in silver, and over \$20 per ton in gold. The ore from this opening is principally chloride of silver. These veins are all in syenite, and run north 31° east near the north end of the Warsaw. The other day the discoverer and locator of the Warsaw claim discovered a cross lode running directly across the Warsaw, and located 600 feet, or the distance from one of his side lines to the other. He went to work and sunk about eight feet deep, showing a beautiful vein of chloride mixed with black sulphurets of silver from 6 to 10 inches wide. The lode is a blind one, but wherever they dig on the line of the lode they get metal. This vein has been traced and located each way for more than a mile. The ore contains no base metals at all. An assay was made from every class of metal, from top to bottom, which gave, No. 1, from near top, \$207.35; No. 2, 259.17; No. 3, two feet from top, \$400.55; No. 4, \$471.26; No. 5, \$604.75; No. 6, \$546.66, giving an average of \$414.62. This mine is certainly a magnificent property. There are many locations of veins near this mine, and as far as they are developed look well. The Oro Blanco mining company's location is in the Warsaw group of ledges. They are driving a shaft down on one of their mines, but as all persons are forbid going into the mine, I can't say how it looks. It is reported that they have very good metal in the shaft. I have not seen any of it, yet their prospects all look well so far as they have been opened up. There are a great many ledges located, and men are busy prospecting and showing up their mines as fast as they are able. This district has certainly many advantages over a great many others in this Territory, that recommend it to the attention of capitalists. We have here the finest climate in the world to work in, plenty of fine wood for fuel, for engines or furnaces, and plenty for making all the charcoal necessary for smelting the class of ores which would require to be smelted. A company that could erect a mill and furnace here, and work ores at living rates, would have a good enterprise; in fact, I know of none better. Here are plenty of good mines, and just across the line in Sonora, within a distance of 25 miles, I have seen over 40 old Spanish mines. Some have been worked to a small extent by the Mexicans a few years ago, but the most of them are just as they were left 100 and odd years ago, when the Spaniards were all massacred by the Indians. I picked up a great many specimens of ore from the different mines, and when I came in I assayed them, and they ranged from \$80 to \$6,000 and over. Now, if reduction works could be built here near the line, large quantities of ore would be brought from Sonora by the Mexicans and sold at such prices as would be profitable to a mill company. Salt can be delivered here at \$50 per ton; wood, \$3 per cord; ores can be worked here cheaper than in Nevada. I will write more fully soon of all the mines.

J. M. KIRKPATRICK.

Oro Blanco District, Pima Co., Arizona.

FOR THE PARIS EXPOSITION.—The ships *Constitution* and *Supply*, two of the vessels placed by the government at the disposal of American exhibitors, says the *Iron Age* sailed early in the week, the first-named from Philadelphia and the latter from the Brooklyn Navy Yard. The consignments are of hardware, agricultural implements, machinery, pottery, pianos, medical instruments generally, furniture, confectionery, crockery, dry goods, paintings and others works of art, and several other articles. No combustible or explosive material has been allowed on board. An interesting exhibit among the *Constitution's* cargo is the collection of the Pennsylvania Peace Society, consisting, among other unique articles, of an agricultural cultivator, with shares or teeth made of swords and the beam of a scabbard; a copy of that part of Gen. Washington's will in which he recommends arbitration instead of war as a means of settling international disputes; an address signed by 1,760 ladies of Exeter, England, to their sisters of Philadelphia, in behalf of peace, and the mottoes used by the society at the celebration of its last decade and at other grove meetings.

Washoe's Waste.

At the C. & C. shaft there is a large room in which the miners change their clothing on going into and coming out of the lower levels. On coming out of the mine their clothes, a woolen shirt and pair of woolen drawers or cotton overalls, are reeking with perspiration and are more or less soiled by the dust that has settled upon them. In the changing room is a large trough, with a supply of hot and cold water. Here the miners wash the clothes they have worn in the mine before leaving for their homes, hanging them on racks to dry, in order that they may have clean clothing when they next go down into the lower levels. In this tank or trough some 600 men daily wash their clothing when going off shift, and in its bottom there collects about 50 pounds per day of sand and clay. Yesterday Col. Fair had the curiosity to have the assayer of the Consolidated Virginia assay office, Henry G. Elder, make an assay of the sediment deposited in the washing tank, and the following is the result: Gold per ton, \$128.60; silver, \$130.50, making a total of \$259.10 per ton for the dirt washed out of the shirts and overalls of the miners. Heretofore the washings of this trough have not been saved, but they will now probably be taken care of by some one, as in the course of a year they would amount to quite a snug little sum.

In the large jewelry manufactories the world over, where the workmen handle and file and burnish gold and silver, they are required to wash their hands in a marble tank, and the amount of the precious metals saved in this way in the course of a year is something astonishing.

We are now able to see that since the opening of the mines of the Comstock half a dozen large fortunes must have been sown broadcast over the country by the winds. The amount of ore that would stick upon the clothing of the miners is as nothing compared with that blown off wagons and cars by the wind. The fine ore thus blown away is generally of the richest character. From a train of 40 cars in going from this place to the mills on the Carson river through a "Washoe zephyr," the loss would probably not fall short of a ton. Of late, however, the precaution has been taken of securing the fine ore by wetting down the loaded cars before the departure of the trains from the ore houses.

In the early days, when hundreds of teams were engaged in hauling the rich ores of the Ophir to Washoe valley, the wagons being all the day on the road, immense amounts must have blown away, as in crossing the mountain and winding around the points of the hills the wind often blew hard enough to scatter not only the fine particles of ore, but also lumps of considerable size from the wagons, piled and rounded up as they generally were.

It could hardly be expected, however, that in those days any one would think of the fine ore blown off the loaded wagons when no one paid any attention to the lumps that were rolling off, and when it was not unusual for teamsters to stop and fill up the chuck holes with the rich ore from their wagons. As men at that time did not think of saving the tailings running to waste from their mills, and almost as rich as the ores that went under the stamps, we can hardly find fault of them for paying no attention to the ore blown from the wagons and scattered along the roads by the teamsters. Now, however, although late in the day, we are becoming wiser, and find that even in the washings of the dirty clothing of the employees of one mine there is a little bonanza of about \$2,000 per annum.—*Territorial Enterprise*.

Silver Peak District.

All over Nevada, and most other parts of our earlier discovered mineral regions, are old districts and mining properties that at one time enjoyed a good local reputation and a promising future. In some instances, a great deal of money was expended in opening these mines, outfitting them with mills, etc. But, for a variety of reasons, chiefly because these enterprises were badly managed, the most of them proved failures, which lead to their suspensions and the almost total abandonment of these districts. After a long interval, many of these localities are again being repeopled, and work in a small way resumed upon the mines.

In 1864 was discovered the Silver Peak district, lying about 90 miles a little south of east from Aurora, in Esmeralda county, State of Nevada. Though situated in a dry and barren country, with few facilities for ore reduction, great expectations were at first entertained of the mines here, because of the apparent abundance and high grade of the ores, which were both gold and silver-bearing. It seemed evident, also, that they could be mined, at least for some time, at small expense. With this good showing for the inauguration here of a profitable mining enterprise, capital was readily forthcoming for the purchase of the property, which, besides a large number of veins, included mill-sites, wood and farming lands, springs, etc., as well, also, as funds for the erection of extensive reduction works, which were completed and went into operation in 1868. After being operated a year or two with indifferent success, the mills were closed down and work suspended, and so remained until last summer, when the property having meantime went into the hands of new parties, it was partially resumed, and has since been continued with a good prospect of being kept up and made remunerative.

The 30-stamp mill, though a little old-fashioned, has been found, with some repairs and the addition of new pans, to perform good work, \$30,000 having been taken out up to the 1st of January and fully as much more since. This has been accomplished running but 10 of the 30 stamps. Since starting up anew it has been found necessary to roast the ores.

A correspondent of the *Inyo Independent*, of recent date, states that the company have had constructed two of the Bruckner furnaces, and that it is their intention to introduce the leaching process. The machinery, which is now on the ground, was made in Chicago and is thought to be about as good as if made in San Francisco. This furnace and other apparatus, costing some \$40,000, will be ready for use by the 1st of April, and will almost insure the success of these mines, of which there are many in the district; the company have patented 16, three of which they are now working.

The Vanderbilt lode, situated two miles from the mill, crops out along the hill a distance of about 1,200 feet; the vein lies flat, and is of the kind usually called a "blanket" vein. It is being worked at a number of places, and is producing ore valued at about \$100 per ton; no great depth has as yet been reached, but prospecting is being vigorously prosecuted, and it is expected that another six months' work will develop a valuable mine; the vein now worked is 10 feet thick, and when the lode is found where it dips down at a proper angle it will certainly be a bonanza. The Pocotello mine, close to the Vanderbilt, and on the adjoining hill, has produced several hundred tons of ore, valued at \$80 per ton; it is a smaller vein, being about eight feet with three feet of ore, and is dipping down at an angle of about 40°; an incline 60 feet deep on the mine shows good ore all the way to the bottom; on these two mines 26 men are at work. The Black Warrior, located about six miles from the mill, is one of the most promising mines of the camp. There are about 300 tons of ore out on the dump that will assay \$200 per ton, and there is not less than 1,000 tons more in sight, but this being base ore, is held back to await the completion of the new mill.

They have many other silver mines which will, in the course of time, be developed. In addition to silver they have gold mines, but of so low a grade that they cannot at present be worked with profit, but will be at some future time.

The Lodi company, of San Francisco, are also preparing to operate here again. They, last summer, built a five-stamp mill; they attempted to reduce ore by the Paul process, but failed—not being posted as to the best method of managing it. This trouble having been remedied, they expect to make a success with this method, and it is probable they will, as it ought to be suited to this class of ores, and they have a good mine.

The town of Silver Peak, at one time, a place of considerable importance, is said to have sadly degenerated, the population having been reduced to a very small number, while its business has nearly dried up. With the resuscitation of the mines, it will no doubt recover something of its former prosperity, with also a better chance of keeping what it may gain.

Carelessness in the Mines—Its Causes and Results.

The *Amador Dispatch*, of Saturday last, delivers a homily on carelessness in the mines—the want of proper protection of miners against the desperate risks to which they are so often subjected through the carelessness of mine owners or their agents, and by which so many fatal accidents are caused, and so many men made cripples for life. The *Dispatch* adds: We are at this writing, unable to recall an instance in this county, where those who were responsible for a large proportion of those "accidents" have been held responsible in our courts of justice. Indeed, but few instances are on record where a matter of this kind has ever been called up for adjudication. In a land where justice is supposed to be dealt out equally for or against all alike, without distinction to class, why are cases of this sort so universally kept out of the courts? Where damages are sustained by the negligence of another, there is no question about the law, if properly administered, holding the guilty party liable. Yet "mining accidents" go uninvestigated, and seem to be looked on as "matters of course." Thus mine owners who are inclined to be mercenary are encouraged to "economize" by using the most defective machinery, incompetent engineers, second-hand ropes, etc., regardless of the destruction of human life. We recognize the fact that accidents will occasionally occur in the best of regulated mines, but there can be no excuse for so many of them. Our cemeteries speak volumes against the fatalities of mining accidents, but the guilty are treated as guiltless. Accidents are of far more frequent occurrence in those mines which use faulty machinery, old, worn-out, ropes, "cheap" engineers and the like, than in mines where the proper precautions for safety are taken. If the law were only vindicated, and a few of those careless, or willfully negligent mine owners, justly dealt with, they would soon be brought to their senses, and accidents would soon become of rare occurrence in our mines. Let steps be taken to bring about this reform in our mining operations, and have a stop put to this wholesale killing of human beings in the mines through the criminal "economy" of those who manage them.

MECHANICAL PROGRESS.

Superheated Steam and Boiler Fires.

A number of French naval officers were detailed some time ago to test the workings of the Bourdon system of injecting superheated steam above the incandescent fuel in boiler furnaces. Although the results they reached may be already known to some of our readers through the French publications, we note from a translation in the *Mining Journal* the following points: The apparatus was attached to two high pressure boilers, each consisting of three combined cylinders set in brick masonry, and was of the following description: An iron pipe of very small diameter carried the steam from the steam drum of the boilers to the front of the furnace, entering the latter near the side of its door at the level of the coal within, and delivering the steam into a faggot of tubes situated in the masonry of the furnace. From the faggot of tubes a second pipe led to a rectangular box of thick iron placed across the furnace above the top of its bridge-wall. In the side of this box facing the fire, is a large number of very small holes with diverging axes which spread out fan-like above the coal on the grate.

The steam taken by the pipe from the steam-drum of the boilers is first superheated in the faggot of the tubes lying in the hottest part of the masonry of the furnace, and is then carried to the box from which its pressure violently projects in fine streams over the whole surface of the incandescent fuel. Cocks, placed at proper points of the apparatus, control the admission of the steam, and drain off the water of condensation when the boilers go out of use.

According to Mr. Bourdon's theory, the superheated steam on coming in contact with the incandescent fuel, decomposes into oxygen and hydrogen, thus furnishing the furnace with a large contingent of pure combustible gas, having a maximum calorific power, whence results an extremely rapid and perfect combustion of all the combustible elements, with a total absence of smoke.

The Board found that Mr. Bourdon's apparatus did produce an extraordinary activity in the furnace; that the flame, instead of being long, undulating and more or less smoky, became, when the steam was injected, short, dazzling and darting like the jets from a blow-pipe; that the draft of the boiler was considerably increased, and that, finally, the furnace showed no trace of smoke, the gases of combustion escaping from the chimney being colorless and only visible, with difficulty, at the moment a fresh charge of coal was thrown in.

EDGE-LAID BELT.—A better plan of making a broad belt than the usual American double leather belting sewed together, is made with the greatest ease, of any thickness or width, perfectly equal in texture throughout, and alike on both sides. It is made by cutting up the hides into strips of the width of the intended thickness of the belt, and setting them on edge. These strips have holes punched through them about one-eighth of an inch in diameter and one inch apart. Nails, made of round wire, clinched up at one end for a head and flattened at the other, are used for fastening the leather strips together. Each nail is half the width of the intended belt, and after the strips are all built upon the nails, the ends of the latter are turned down and driven into the leather, thus making a firm strap, without any kind of cement or splicings. When the strap is required to be tightened, it is only necessary to take it asunder at the step lines of the splice, cut off from one end of the strap at each step what is required, and piece up again with wire nails or laces, going entirely through the strap. —E. Leigh.

PRESERVING WOOD BY THE APPLICATION OF LIME.—The method of preserving wood by the application of lime, as pursued by M. Svostal, is published in the French journals. He piles the planks in a tank, and puts over all a layer of quick-lime, which is gradually slaked with water. Timber for mines require about a week to be thoroughly impregnated, and other wood more or less time according to its thickness. The material acquires remarkable consistence and hardness on being subjected to this simple process, and it is alleged, will never rot. Beechwood has been prepared in this way for hammers and other tools for iron works, and is said to become as hard as oak without parting with any of its well-known elasticity or toughness, and to last much longer than when not thus prepared.

FIRE-PROOF JOIST.—An ingenious kind of fire-proof joist, recently introduced, consists of a slip of wood five inches wide by five-eighths of an inch thick, held between two flanged strips of quarter-inch iron, making a beam quite as strong as those of wood ordinarily employed. The iron sides, in addition to affording strength, it is claimed, render the joist substantially fire-proof, while the center of wood affords the means of putting down floors and nailing of laths in the usual manner. The impediment to the manufacture of these joists heretofore has been the difficulty of rolling the flanged iron sides, but this has now been successfully overcome.

A Task for Young Mechanics.

It is time we gave our boys a chance to show what mechanical skill they possess beyond common whittling. Let them practice on the following plan of making a cheap and neat book-case, which has cost only a few dollars. The case consists of two end pieces and two shelves, with movable shelves between the two rigid ones. The two end pieces are one and a quarter inches thick, eight inches wide and four feet high. Four inches from the lower ends, a shelf eight inches wide is neatly fitted into gains in the end pieces, and six inches below the upper ends, the top is held in by other gains. Instead of nails, two large three-inch wood-screws were driven through the end pieces into the end of each shelf. The shelves are eight feet long. Between the two end uprights, two other upright pieces eight inches wide are fitted between the two rigid shelves, thus dividing the space between the upper and lower shelves into three equal spaces or divisions. Screws are put through the shelves into the ends of the middle upright pieces. Those 16 screws hold the parts together with desirable firmness. The advantage of using screws instead of nails is, that in case it were necessary to transport the book-case, the screws could be taken out, the parts tied together firmly, and the book-case would occupy but little space, and the varnish would be marred less. Before the parts were screwed together, gains were cut in all the upright pieces to receive the ends of the shelves. I employed a joiner's dado to cut the gains. A dado consists of a small plane somewhat like a rabbit plane, with which a small gain can be cut true and neatly, in about a minute. I made gains two inches apart in the upright pieces, so that the shelves between the bottom and top shelves can be adjusted to suit large books and small ones. After it was finished, the surface was sand-papered, after which a heavy coat of boiled linseed oil was laid on evenly. After a few days, the surface was again sand-papered, and two coats of shellac varnish were laid on, which gave the wood a beautiful and glossy straw-color. The lumber employed was white pine, but boards of any other timber, such as chestnut, butternut, tulip, basswood, sugar maple, or oak of any sort, would look beautifully if sand-papered and varnished with shellac. Such varnish can be procured at most paint stores. In case shellac cannot be procured conveniently, use any other good varnish. I procured three boards about eight inches wide, and one board 16 inches wide, or nearly that width as could be found, all 16 feet in length. Hence the waste in making was small. I purchased 55 square feet, at five cents per foot, \$2.75. Sixteen wood screws, 16 cents. Oil and varnish, 30 cents. The labor, nothing, as the case was made when I would have been doing nothing else. A book-case with glass doors, that would contain as many books as this cheap affair, would cost \$60 to \$80.

PLATINUM PLATE.—For the coating of iron with platinum, M. Dode, of Paris, the well-known discoverer of the platinum mirrors, has patented a process in England which is described in the *Polytechnic*. The iron first receives a coating composed of lead and copper, and then the platinum is applied. The first coating is prepared by mixing 22 parts of borate of lead and 41 parts of cupric oxide in oil of turpentine, and is applied by means of a fine brush. The platinum coating is prepared by converting ten parts of platinum into chloride and mixed with five parts of ether and permitted to evaporate in the air. The residuum is mixed with a viscid combination of 20 parts borate of lead, 11 parts red lead, and some oil of lavender, and 50 parts of amylalcohol added to the whole. In this mixture the object to be plated is dipped, allowed to dry in the air, and then heated to a moderate temperature.

FIRE-PROOF CONSTRUCTION.—Capt. Shaw, head of the London Fire Brigade, writes: "No fireman has ever seen a stone stair escape when subjected to much heat, and no internal wall supported on iron can be relied on where there is much heat. At the present moment may be seen at the corner of two streets a new building supported entirely on iron columns without any wall, wood or brick work reaching to the ground along the whole line of the front. At the ordinary temperature of 600 to 700° Fahr., the whole building must inevitably fall, and such a temperature could easily be created by the combustion of a small quantity of furniture." The conclusion seems to be that brick or iron, covered with brick and plaster, which has been subjected to fire, are the only fire-proof materials really deserving the name.

GILDING AND SILVERING OF GLASS AND PORCELAIN.—Sulphur is dissolved in oil of spike lavender until it has a semi-liquid consistence; this is mixed with an ethereal solution of chloride of gold or of platinum, and the mixture evaporated to the consistence of paint. The surface to be gilt or silvered is then covered with the mixture, and the object carefully heated in a muffle, whereby the volatile substances are expelled and the metallic gold or platinum fastened upon the glass or porcelain. The surface, thus metalized, is afterward plated in the usual manner with the solutions in gold, silver, or copper, and with the aid of a galvanic battery.

SCIENTIFIC PROGRESS.

Note on the Cliff Dwellers in New Mexico.

During the field operations of one of the parties connected with the United States Geological Survey of the Territories, in charge of Prof. F. V. Hayden, portions of southwestern Colorado, northwestern New Mexico, and northeastern Arizona were traversed, embracing that broken-up country occupied in remote times by a race of people who were known as the cliff-dwellers. This subject is well known to readers in general, but we must recur to it again so as to be able to reach the importance of the discovery to be described.

In one of the canyons, known as the Chaco, Mr. W. H. Jackson made detailed investigations and measurements of the immense ruined buildings. In one of the arroyos or dry water courses, the sectional view of the alluvial deposit was exposed to a depth of about 16 feet. Fourteen feet beneath the surface, a layer of pottery and debris came to view. This may not seem strange, as, in a comparatively narrow valley, dirt and gravel to the depth of 14 feet might be deposited in a short term of years. But, 10 feet above this layer, the foundation walls of ancient buildings were visible, built upon another layer of gravel and sand. These were in times covered with the alluvium upon which now stand the famous ruins, of which no history is extant, and of the builders of which no history will ever be known. How many ages have passed since the lower or first bed was the surface, upon which moved the numerous hordes of which all evidence at present is hidden behind the veil of the dark past?

Now, a skull comes to view upon the layer of pottery, which is henceforth two eras of occupation and semi-civilization. This skull, in its contour, is unique. Its closest relations are the ancient Mexicans, Peruvians, Caribs, and Natchez. There is an extraordinary flattening of the upper posterior portion of the head (posterior parietal), which is evident in those figured in Morton's "*Crania Americana*." The contents of the skull as found, consists of sand, which is now as hard as ordinary agglutinated sandstone, and has in nearly all portions, the appearance of limonite. The skull will be described and figured by Dr. W. J. Hoffman, of the Hayden Survey, and it affords another strong link in the chain of facts and hypotheses of the cliff-dwellers and the ancient Mexicans being more nearly related than is generally admitted or supposed.

MICROSCOPICAL EXAMINATION OF WATER.—W. L. Scott, in the London *Microscopical Journal*, says that often when the result of a chemical examination of a water makes it passable, a microscopical examination furnishes evidence upon which the water should be condemned. To assist in the microscopical examination of waters, he filters them through papers, the center of which is rendered impervious by being coated with a mixture of 35 parts of vaseline and 65 parts of ozokerite. The living and dead suspended matter is thus concentrated within a small volume, and microscopical examination then reveals the number and varieties of organisms in a definite quantity of the water under examination. Mr. Scott says he has employed this method of procedure to learn the nature of the water often added to milk, and that in half a pint of one sample of milk he detected decomposing vegetable and animal matters, and also 87 living animalcules.

THE POLAR COLONY.—Capt. Howgate's plan for a new expedition to the North Pole has met the approval of the Senate and House Committees on Naval Affairs. It is proposed to appropriate \$50,000 for this "Polar Colonization" scheme. Capt. Howgate has obtained the support of many prominent geographers and explorers, who have, at their own expense, sent out an advance expedition to collect supplies for the permanent colony. The place selected as the site for the colony's headquarters is on the shore of Lady Franklin bay. It is also worthy of note that the Senate has given formal approval to a new enterprise by James Gordon Bennett, to equip a polar expedition.

TEACHING GEOGRAPHY BY RAILWAY SIGNS.—The Southern and Eastern railway companies of France have recently acted upon a suggestion of the Lyons Geographical Society, and added to the names of their stations statistics concerning the geographical position, elevation above the sea level, population, industries, etc., of the towns wherein they are located. To further popularize geographical knowledge, some towns have also erected stone pillars, upon which are placed various meteorological instruments, maps of the towns and environs, the bearings and distances of the capitals of Europe, and places of interest in the neighborhood, and other information.

NATURAL GAS IN OHIO.—At East Liverpool, Ohio, contracts have been made for the boring of four more natural gas wells. The various uses to which this gas has been applied continues to excite the wonder and astonishment of all visitors to this town.

Movement of Air Bubbles in Liquids.

In a paper in the *Bulletin* of the Belgian Academy of Sciences, Prof. Van der Mensbrugghe discusses the causes of the seemingly spontaneous movements of bubbles of air in levels and of vaporous bubbles in the microscopical cavities of minerals, these researches being part of those into the tension of surfaces of liquids. Prof. Mensbrugghe explains these movements, as Mr. Hartley also does, by changes of tension in the surfaces of liquids produced by changes of temperature; when the temperature of the liquid at one end of the bulb becomes, for some reason, higher or lower than at the other end, however small the difference, the tension of the surface decreases at the warmer end, and the bubble moves toward it. But, a thin film of water remaining on the glass, the surface of the liquid is enlarged at the warmer end, and diminished at the opposite end, and this, says Nature, according to experiments of the author, lowers the temperature and increases the tension at that end; so that if the temperature now ceases to rise, the motion of the bubble is not only stopped, but the bubble also returns backward. Thus each displacement of the bubble immediately gives rise to such forces as tend to produce a motion in an opposite direction; and the variations of tension produce the more obvious motions the smaller the masses of liquid in which the bubble is swimming. The same explanation may be applied also to the movements of bubbles in microscopical cavities of minerals filled with liquids. In that case, the bubble being produced by the vapors of the liquid, its movements are yet more rapid, as every change of temperature is followed by further evaporation of the liquid, or by condensation, both which alter the dimensions of the surfaces of the liquid and their tension. The author supposes also that the Brownian motions of powders suspended in liquids may be explained in the same way, and that those powders which absorb most gas will best display this kind of motion.

Coal Plants.

On the 8th ult., Prof. L. C. Miall gave a lecture at Leeds, England, on coal plants. He said the coal plants were preserved in a great variety of forms, sometimes flattened out as thin as a sheet of paper between layers of hardened mud or shale and sometimes the whole structure of the plant was found in a thoroughly recognizable state. The most important of these plants, from many points of view, and one of the most common, was the *Lepidodendron*. It was a tree of considerable size, having a tall upright stem and at the top many branches, which were distinguished from those of many coal plants by the fact that they continually forked or broke up into two, and this again and again. After referring briefly to several other coal plants—the sigillaria, the calamite and the coniferous ferns—the lecturer proceeded to explain the structure of the *Lepidodendron*. In its general features the stem of the *Lepidodendron* resembled that of a common tree. It had the pith in the center, then a ring of wood and then the bark outside. When examined closely it was found that the pith in the center was very large, then immediately outside the pith there was a sort of cylinder or sheath of the pith, made up of vessels which served for the transmission of air from one part of the plant to another. The four main trunks broke off into smaller ones and these again gave off numerous rootlets. The roots, instead of becoming smaller and smaller as they extended, and as was usual in common trees, broke off abruptly. They were distinctly articulated and there was another sort of joint at the point of union, a peculiarity not known in any living plant. Another peculiarity was that the four main trunks were divided from one another by distinct lines. He then explained the nature of the spores which were found in all the better coal in common use in this country. Certain parts of plants were selected for preservation, all the rest disappearing. The difficulty was not to explain how so much had disappeared, but how some parts should ever have been preserved. The lecturer said that researches into the plants of the coal-measures had not yielded a single new type of vegetation.

CRANIOLOGY AND CRIME.—The *British Medical Journal* presents, at some length, the results arrived at by Prof. Benedict, in his examination of the brains of criminals—some sixteen in all. Every one of these, in comparison with the healthy brain, proved to be abnormal. Not only, too, has he found that these brains deviate from the normal type, and approach that of lower animals, but he has been able to classify them, and with them the skulls in which they were contained, in three categories. First, absence of symmetry between the two halves of the brain. Second, an obliquity of the interior part of the brain or skull—in fact, a continuation upward of what is usually termed a sloping forehead. Third, a distinct lessening of the posterior cerebral lobes, so that, in the lower animals, they are not large enough to hide the cerebellum. In all these peculiarities, the criminal's brain and skull are distinctly of a lower type than those of normal men.

PURE HYDROGEN.—According to the bulletin of the Chemical Society of Paris, hydrogen may be purified by passing it through the following solution: Bichromate of potassa, 100 grammes; water, 1,000 grammes; concentrated sulphuric acid, 50 grammes.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

WILL BE CLOSED.—*Chronicle*, March 9: The sale of the English mines, in Scandinavian canyon, by the Sheriff, will take place on Saturday next, our English cousins being too slow in liquidating. In the hands of a live San Francisco company, these mines would soon be paying.

SETTLING UP.—Cyrus Palmer, President of the Advance company, is at Monitor, paying the company's indebtedness. The creditors are disposed to give the company a good show to get out of their difficulties.

AMADOR.

STARTED IN.—*Ledger*, March 16: The extensive tract of auriferous ground between Pine grove and Volcano, purchased, last summer, by San Francisco capitalists, is now being put in shape for active operations, a large number of men being engaged in building a flume, which, when completed, will be the finest piece of work of the kind to be found in the county. Altogether it will be 6,000 feet long, three by three feet in the clear, constructed of one and a half inch lumber. About 250 feet are already completed and the company intend to push the undertaking through with all possible speed. It is worthy of special mention that no Chinamen are employed upon the work. This locality is rich in gold and the men who have now got possession of it are determined to roil it of its treasures.

KENNEDY.—The second clean-up was made on the 14th of last month. The result was little different than that obtained by the first crushing—between \$5 and \$6 per ton. This is sufficient to pay expenses and leave a small margin of profit.

MONTRICHARD.—The new steam hoisting works were started last week. The machinery runs smoothly. Getting the shaft clear of water is the matter immediately in hand and will take a week or two. The branch ditch, to carry the water to the mill, is completed, with the exception of laying the pipe. The mill is progressing as rapidly as possible and in a few weeks both mine and mill will be in full blast.

MOORE MINE.—Shaft has been drained of water and prospecting is now going on. So far developments have fully come up to expectations. The intention is to prospect extensively with a view to the erection of a mill if developments warrant.

At the Phenix, last Wednesday, a cave occurred in the south shaft, and, in consequence, 20 stamps were suspended until Sunday, when the damage being repaired, they resumed operations. The mill is running to its full capacity and good rock is being operated upon.

IRISH HILL.—*Dispatch*, March 16: Gravel operations are active here and the mines paying well.

WABASH.—The shaft is down about 60 feet, with a lead nearly four feet wide. The company is at present crushing by the arrastra process, some of the rock worked glistening with gold.

MORE RICH ORE.—R. C. Downs has discovered some rich quartz in his mine, near Volcano. The quantity is not yet known, but the indications are that there is an abundance of it.

BUTTE.

SHUT DOWN.—*Mercury*, March 15: The Oroville Gravel Mining Co., has stopped work for the present on account of not being able to get proper machinery to hoist the gravel and pump out the water. There is now over 100 feet of water in the shaft. About the middle of next month they will commence operations again with suitable machinery. The officers are taking time in order to have everything complete when work starts again, to wash the gravel as fast as it comes out, for every spadeful has gold in it in paying quantities. He who owns stock in it should hold on, for it is worth all that it costs and much more.

CALAVERAS.

RICH QUARTZ.—*Chronicle*, March 11: Brady, Wallace & Co., who lately commenced work on their quartz claim in Wet gulch, Jesus Maria district, are making rich developments. The vein, upon which they are sinking a shaft, shows remarkably well, being wide and the ore all of a good milling quality. They have a full force of experienced miners employed and are pushing operations with energy under the stimulus of excellent prospects.

MINING JOYS.—The Wallace & Ferguson mine at Sheep Ranch yielded \$14,000 last month. The pumps have been started, taking the water out of the Chavanne mine at Sheep Ranch. A wide ledge and good rock have been struck in the Doyle mine at West Point, now owned by Terry & Co., of Stockton. Splendid ore is being mined in the Champion, West Point, at the depth of 380 feet. Still sinking and working stopes. Everything is looking well at the Enterprise Consolidated, at West Point. Operations are progressing steadily and favorably at the San Bruno, Mosquito gulch.

EL DORADO.

UNIONTOWN.—*Mountain Democrat*, March 16: The old Stuckslager mine is again turning out exceedingly rich ore. The white men min-

ing here are all making big wages washing with water supplied by the late rains. Some are washing at points far above the ditches where little has been done for years before.

WATER FOR ALL.—The California water company and the El Dorado water and deep gravel mining company will be able to furnish the miners with large supplies of water this season. The first supplying it to those on the Georgetown and the latter to those on the Placerville divide.

THE IDA LIVINGSTON.—On this mine, owned by San Franciscans, work is being vigorously pushed. It prospects well, and hoisting works having already been put up a mill will likely be added at an early day.

KELSEY AND VICINITY.—If there is a prosperous people in El Dorado county, they are to be found about Kelsey, and from there on to Johnstown, the business men carrying large stocks of goods while every miner is making more than wages. The ranchers, too, anticipate a rich harvest. Siesnop is working his Kelsey claim, and doing well.

THE KEEGAN MINE.—The shaft is now down some 35 feet, and the owners are highly elated over the prospect. It is now conceded that the old tunnel, which has been pushed to a distance of 105 feet, is too high for the main ledge.

INYO.

A BONANZA.—*Independent*, March 9: Green Hitchcock and others of his family have opened up a little gold ledge in the Alabama range, which seems to be a real bonanza. A few pounds of the ore, pounded up in a hand-mortar, gave a net return of \$120 gold bullion. The width of the seam of this class of ore is from three to five inches.

THE BIG TUNNEL.—Superintendent Holt writes from San Francisco, that he has perfected every arrangement for the immediate commencement of work on the Independence tunnel, with a backing solid enough to secure its final completion. This is good news for this section.

RUNNING.—The Beauty furnace is again running and turning out splendid bullion. No dead work is being done in the Union. The great bulk of the ore is being taken from the old works, supposed to have been worked out two years ago.

NEVADA.

MORE STAMPS.—*Grass Valley Union*, March 16: The 18 new stamps of the Murchie mill started up on Wednesday. The mine is looking finely, the ledge on the 400 level being three and a half feet thick and showing well in free gold and sulphurets.

TOO MUCH SURFACE WATER. is the complaint of our prospectors at present, and some of the mines with machinery have all they can do to keep the water in check.

The Alaska mine is looking fine and the dump pile shows plenty of paying rock. On account of the bad roads the rock has been accumulating on the dumps for several months, and a large amount is now on hand for crushing, which will be put through the stamps as fast as hauling can be done.

GOOD RESULTS.—Both the American and the Milton companies have cleaned up lately with excellent results—the latter between \$35,000 and \$40,000.

MACHINERY.—*Foothill Tidings*, March 16: The machinery for the new air compressor at the Idaho mine came over the narrow gauge, this week, occupying three flat cars. This is believed to be the most powerful machinery of this kind on the coast, and is intended to suffice for working the mine to any depth likely to be required. It weighs 26 tons.

ABOUT TO START.—Thomas Craklin has erected hoisting works on the "Old Bobby Smith" ground, contiguous to the Rocky Bar mine, and will start up steam about the last of this week. The ground is held in high estimation by old miners.

PLACER.

IOWA HILL.—*Dutch Flat Forum*, March 16: The Canal company's large reservoir has water enough in it to supply the three large claims of the district, and is expected to run 5,000 inches shortly. The rains have furnished the mines in this vicinity an abundance of water, and miners as a general thing are taking advantage of the situation by working with energy that is certain to secure them a good harvest of dust in the spring. The ditches are all full to overflowing with the partial exception of the big canal, and the great depth of snow around its headwaters affords encouraging prospects for a late season. Iowa Hill and near vicinity have some 18 hydraulic claims in successful working condition, and the outlook for the future has not been so flattering for a number of years.

CEMENT MILLS.—There are two mills for crushing cement, one situated at Roach hill, and one at Wisconsin hill. The latter is something entirely new in its application to mining, and bids fair to work a complete revolution upon the old system of cement crushing.

MINING elsewhere throughout the county is being pushed with great vigor, the hydraulic claims about Dutch Flat, Gold Run, and on the Forest Hill divide, being worked to their full capacity.

SIERRA.

ALLEGHANY.—*Mountain Messenger*, March 18: The Oriental quartz ledge, Wet ravine, has been purchased by San Francisco capitalists for \$30,000. Ten men are now employed. The old cave is being repaired, and as soon as the water is out of the shaft a large force of men will be put out, and the mill begin to crush. Golden Star Co. are running their main tunnel ahead. Gravel prospects well. Mammoth Co., Chippis Flat, are

taking out pay. More men will soon be needed. Bald Mountain Co. did well at their late washing-up. The "upper yard" paid \$38,000, an average of about \$4 to the car-load, and fully \$5,000 more than they ever obtained from the same amount of gravel before. The lower yard contains three times as much gravel as the upper one, and it is equally as good. From the clean-up the company paid all debts and a balance of \$20,000 still remains in the treasury. Usually the Bald Mountain gravel averages \$3 to the car-load, but this year it is improving.

BUSV.—There is not an idle man at Brandy City or Indian Hill. Plenty of water at both places. Arnot & Co. are working from 25 to 30 men in their diggings at Brandy City.

BRUSH CREEK.—The Brush Creek shaft is down 30 feet in that streak of rich quartz and there are yet no signs of its giving out.

MORRISTOWN.—The American hydraulic company's ditch is open, and are washing off considerable ground. Have 100 inches of water, and this will be a lively camp this year.

PLUMAS.

THE PLUMAS NATIONAL.—*National*, March 9: A four weeks' run yielded \$12,730, being \$12.50 per ton. The mine is looking splendidly, the tunnels showing 400 feet of continuous pay-rock. An attempt was made to work some of the sulphurets, but it was not successful. A roasting furnace is now being built. The sulphurets are rich.

SHASTA.

FURNACEVILLE.—*Reading Independent*, March 14: The mining news here at present is rather meager, but it will not be long before there will be items of interest to note down, as a great amount of work will be done in the district as soon as the weather will permit.

RICH.—Conway and Small have struck a rich quartz ledge on the North fork of Flat creek about ten miles northwest of Reading. The rock taken out so far is variously estimated as being worth from \$75 to \$200 a ton. Gold is plainly visible in nearly every piece of rock taken out. Several claims have been located in the vicinity.

TUOLUMNE.

COLUMBIA.—*Independent*, March 16: Mining will be more extensively carried on in this district this year than in any previous year for the past five, judging from the extensive preparations being made throughout the district. Quite a number of giants will be employed in washing in different localities, and the yield of gold will no doubt make a good showing in the aggregate. The approaching season is suggestive of a Tuolumne railroad.

TRINITY.

IS SATISFIED.—*Journal*, March 16: A partial clean-up was made in the Ward mine on Oregon gulch mountain this week, resulting in obtaining \$2,900. This amount, Superintendent Lovridge says is entirely satisfactory, being more than was expected, as only the lower end of the flume was cleaned, the head boxes being covered. Good work is being done in the mine and large results confidently anticipated.

MUCH more work has already been done in the gravel mines of this county the present season than all of last year.

Nevada.

WASHOE DISTRICT.

OPHIR.—*Gold Hill News*, March 20: The ore in west crosscut No. 2 from the south lateral drift on the 1900 level, though very rich, proved to be only about four feet in thickness, and up to a late hour last evening, crosscut No. 3 had failed to develop any ore at all. Another crosscut, 60 feet south of No. 3, has been started, but cannot possibly reach the ore for some days yet. The north drift on the same level, upon which much hope was based, has also failed to develop a greater width of ore. In this drift the ore is one day very rich and perhaps the next quite poor, so that the hopes of those who hold the stock have one day been raised to exultation, the next cast down almost to despair. The drifts and crosscuts, however, have shown one or two most favorable and hopeful features, and those are that the new ore channel is several hundred feet in length, the ore generally of a rich character and the prospects of its improving in a downward direction almost a certainty. Sinking the east winze below the 1900 level is going steadily forward, the work being somewhat hindered by a flow of water that was so strong yesterday as to necessitate the putting in of pumps to keep it down.

CON. VIRGINIA.—A breakage of the lower flange of the lift pump permitted the water to rise in the C. & C. shaft some 80 feet or more, completely drowning the pumps and necessitating the running of water tanks in both hoisting compartments of the C. & C. shaft, so that for nearly six days no ore could be hoisted to the surface. The supplies of ores at the mills, therefore, soon became exhausted and it was found necessary to shut down for the time being several of the mills. This has thrown the bullion production of the mine nearly six days behind the usual amount taken out at this time in the month. The pumps have all been repaired at the C. & C. shaft, the water drained, extracting ore resumed and everything to-day is running as usual. The prospecting drifts on the 1840 level had, of course, to be stopped for the time along with the other works, so that but little was done in either the drifts or the winzes.

CALIFORNIA.—Daily yield, 650 tons of ore.

The lateral drifts on the 1550, 1600 and 1650 levels, have all made the usual rate of progress, without any change worth noting. On the 1750 level the ore body to the westward of the north lateral drift in crosscut No. 6, continues of a very rich character. Owing to an accident to the C. & C. pump, which permitted the water to rise rapidly for a day or two in that shaft, but little work has been done in the mine below the 1750 level during the week. The hoisting air engine for sinking this shaft was taken into the mine yesterday, and is being placed in position ready for use to-day.

UTAH.—The west crosscuts on the 1150 level and the east crosscut and south drift on the 1350 level, show no change of value whatever during the week. Everything is working well.

JUSTICE.—Daily yield, 180 tons of ore. This ore is yielding from \$30 to \$38 per ton and the aggregate production of the two mills for this month will not fall much if any short of \$100,000. The south drift on the 1000 level is still advancing, the face in good ore. The main south drift on the 1150 level is also showing fine ore. Ore stopes are being opened farther to the southward on the 1150 level than the mine has ever before been worked in that direction. The north drift on the 1150 level is showing some good ore and has nearly reached the south line of the Lady Washington.

CROWN POINT.—Yesterday morning a sudden inburst of water occurred in the south drift on the 500 level. For some time it has been penetrating good quartz, which has shown a steady improvement. This morning the flow has greatly decreased and is now under easy control. This body of water in the vein is believed to be a good indication, and as the entire block of ground extending from the 500 to the 400 level is unexplored, strong hopes are entertained that a body of paying ore may yet be found.

OVERMAN.—The main east drift on the 1200 level is still advancing in the same splendid character of quartz heretofore described, the only change noticeable being a gradual increase of the ore assays during the past few days, some of the assays running as high as \$12 and \$15 per ton. On the 1400 level the east crosscut is steadily advancing, the face still in fine vein matter. A crosscut west on that level has also just been started nearly opposite the incline winze.

SILVER HILL.—Sinking the main incline was stopped for a day or so during the week by the breaking of a pump-rod near the 444 station. On the 600 level the crosscuts show no new or important changes. The winze below this level has passed to the westward of the good ore and is now in quartz that assays from \$15 to \$20 per ton.

BEICHER.—The water is now entirely drained from the south incline below the 1600 level and an upraise from the 1900 level has been started to connect with the main incline shaft. On the 1900 level a crosscut east has been started in the ore vein opposite the south winze. On the 2160 level a south drift has been started in the ore vein, the face of which is in fine solid quartz, which affords low assays.

YELLOW JACKET.—Sinking the winze on the 2200 level is being energetically prosecuted and it has attained a depth of 83 feet below that level, following the slope of the ledge and winze; bottom dry.

ALTA.—The north drift on the 1150 level is steadily advancing, the face in quartz showing some ore and a general improvement in the character of the quartz and make of the ore vein that looks very promising.

JULIA CON.—The east drift on the 1800 level is still advancing in quartz, clay and porphyry mixed.

HALE & NORCROSS.—The new plunger pump, 50 feet below the 2000 level, is now running splendidly, and can much more than hold the water in check running at the very slow rate of five strokes per minute; but draining the main shaft below that point cannot be proceeded with until the donkey pumps are again lowered.

CON. IMPERIAL.—Sinking the north winze is being pushed vigorously forward to reach the 2400 level. The bottom of this shaft is still in vein matter. The 2400 level is steadily advancing, the face in quartz and vein matter, to meet and connect with the joint north winze on the Alpha line.

SUTRO TUNNEL.—Total length, 19,131 feet. At the present rate of progress it will take five or six months to run through to the west wall of the lode, during which time good ore developments are very liable to be made by the tunnel.

CALEDONIA.—The north drift on the 1600 level is making steady progress toward the Overman line, the face showing some excellent quartz and low grade ore.

CHOLLAR-POTOSI-COMINATION SHAFT.—This shaft is now down 2,008 feet perpendicularly, being by 200 feet the deepest perpendicular shaft in the State.

SIERRA NEVADA.—The east drift on the 1700 level is making good progress, but has not yet reached the point at which the diamond drill was recently lost.

BULLION.—The 1840 station in the main incline is completed, and the east drift on that level started up to cut and prospect the ore vein to the eastward.

NEW YORK.—Sinking the main shaft is going vigorously forward, the bottom still in a splendid character of quartz and vein matter.

SUCCOR.—The main shaft is now down 1,060 feet. At the depth of 1,050 feet a station is being put in preparatory to opening a new level.

TROJAN.—New pumps have been put in to

guard against any increased flow of water that may be encountered.

GOLD & CUREY.—The pumps are being kept steadily running, and are fast draining the water from the 1900 level.

MEXICAN.—The east and west drift on the 1900 level have been connected, and the needed ventilation obtained.

SAVAGE.—But little gain on the water has been accomplished during the past week. It now stands about 55 feet below the 2000 level.

ELY DISTRICT.

ALPS.—*Record*, March 9: Tuesday night, after a nine months' search, day and night, the vein was cut in the upraise from the south cross-cut drift. When first cut, it was over three feet in width; the ore averages \$75 per ton. This is thought to be the long-looked for true fissure that was lost two years ago in the levels above. Steam was gotten up at the works yesterday and an extra force of men put on. This strike has given a new impetus to mining out in the direction of the old Alps and several owners of claims in that vicinity have started to work their mines.

MAZEPPA.—There has been a marked improvement in the company's Mazeppa mine during the past week. The new stop between the 9th and 12th levels has improved perceptibly; some very rich ore has been found in the 8th stop; feeders of the drift running west from 12th station. The ore from the mine has pulped \$122 per ton during last week. Mill is running regularly.

RAYMOND & ELY.—Waiting for the air compressor and Burleigh drills, meantime, however, as everything else is in good working order, a number of men will be placed at work in the upper levels until such a time as work will be started on the 1200 level. The splendid development that was being made on the 1200 level at the time the water interfered and drove the workmen out, makes all interested in the early arrival of the air compressor for the further prosecution of the work on that level.

EUREKA DISTRICT.

EUREKA CON.—*Sentinel*, March 16: The Eureka tunnel is now in 40 feet. A stringer of ore has been encountered, running parallel with the drift. The rock in the face is getting somewhat softer and easier to work. The cost of extracting, transporting and reducing ores by this company averages \$21 per ton. The Richmond estimate is a trifle more, the item of transportation being higher.

RICHMOND CON.—The Richmond company is shipping an average of 80 tons of lead per day. Coal receipts at the Richmond furnaces have been very light for the past two weeks, but the delivery by rail will be resumed with increased volume from date. From 10 to 16 car-loads of crude hullion and refined lead are shipped from Eureka every day.

BALD EAGLE.—An ore body of mammoth proportions and high grade has been opened here, and only awaits the pick and blast of the miner to yield a large output. What the dimensions of the bonanza may be can only be determined by future exploration, but there is little doubt that the drift running from the foot of the incline will tap the same vein uncovered in the level above.

VARIOUS MINES.—The main shaft at the Ham-hurg is now down 550 feet, and will be completed to the 600 level in a few days. A solid body of ore, four feet thick, and of high grade, has been struck in the east crosscut on the 250 level. The drift from the 200 level of the Jefferson is in favorable ledge matter, and there are indications of the near presence of an ore body. The new ore body at the Connolly is developing into magnificent proportions. Seventy tons, extracted last week, worked \$105 per ton. The Prospect Mountain tunnel is in 557 feet, the face being in hard crystalline limestone. The present progress is very slow. The daily bullion output of the K K furnace averages about eight tons, or \$2,400 per day.

Arizona.

THE HACKBERRY MINE.—Late advices from this mine are most encouraging to the owners. The main shaft is now down nearly 450 feet; various other shafts of lesser depth open up the mine for a length of 600 feet. All the shafts and levels are showing increased bodies of high grade ore. There are 1,000 tons of ore now on the dumps, which it is expected will mill some \$200 per ton, and 4,000 tons in sight of equally good ore. The new mill is nearly completed, and will soon be pounding out the hullion. A new set of hoisting works are also in process of erection at the mine, with a capacity to sink 1,500 feet. Both mill and hoisting works were made by the Pacific iron works of this city.

PINAL COUNTY.—*Florence Citizen*, March 8: The adobe furnace at Globe City, though doing well and running out much silver, will be taken down and a brick one substituted in its place. The Miami mill is still idle, awaiting the completion of the new brick furnaces. The five-stamp mill at the Picket Post is running perfectly. The pulp is passed over the Frue helts only once and not over \$10 to \$13 per ton is lost. This is good work and a strong argument in favor of the concentrators. The Surprise has a handsome vein of ore, narrow, but very rich. The little mill at Hewitt's station, 15 miles from Florence, is working and gives great satisfaction. The operators pronounce the pan process a great success. Stone is now being hauled from the Picket Post, for the purpose of constructing a furnace for roasting ores. The Silver King is still closed. No one knows what the "boss" intends to do, but some one who

was in the mine lately says the native silver sparkles on every side and the walls of the cuts appear as if studded with diamonds. The \$75,000 shipment of rich ore from the McMillen mine has been forwarded from Yuma.

VARIOUS ITEMS.—*Miner*, March 8: Rich strikes in gold quartz have recently been struck in the mines of C. B. Genua, C. P. Stanton and others, near Antelope creek, on a line with Rich hill and adjacent thereto. Masterson's mill is kept steadily at work on pretty good silver ore, by the lessees, Messrs. White & Norvel. The Peck mill is running 12 hours a day. The Tipton mill is running night and day. The Geo. Cook mill will start up to-morrow. The mines show well in gold and there is enough water for milling purposes. The McCracken mill runs like clock-work, and the friends of the camp are in hopes of soon having another mill in operation, making the number of stamps 50—a pretty good showing for a camp not ten months old yet.

THE "75."—*Sentinel*, March 16: This mine, in the Pioneer district, is attracting notice. Main shaft is now down 125 feet and under contract for a depth of 200 feet. The ore body has been explored by drifts and the owners are satisfied that they can supply ore to five stamps. S. W. Foreman, Esq., the Superintendent, has gone to San Francisco, to inspect and ship the machinery, which has already been purchased. It consists of a five-stamp battery and Frue concentrators, like those in use at the Silver King, with power for running another battery and pans if desired. To save time, the timbers have been dressed and framed at San Francisco, and will be shipped with the machinery within a couple of weeks.

The last shipment to San Francisco of Santa Domingo ore realized at the rate of \$643.49 per ton.

Colorado.

ITEMS.—*Denver Tribune*, March 6: Sufficient ore can be had in the immediate vicinity of Silverton for another smelter of ten tone capacity. The Crisman mill, at Camp Tellurium, has just been started up, and the prospects are good for a lively time the coming season. Good strikes are reported from all parts of the Telluride belt, and several mines which have lying idle are soon to be reopened. A rich strike of telluride ore is reported to have been made in the Kearne lode, Gold Hill. The Longfellow lode in Central gulch is producing some fine ore. The last shipment paid the owners \$185 per ton. They claim to have from 12 to 18 inches of that class of rock. Prospectors report the discovery of copper in large quantities about 40 miles above Canon City. Specimens assay as high as 60%. The Golden smelting works has shipped 36 car-loads of ore and tailings since the first of January to date. An increase over the same time last year of 100%. The Smith lode, near Black Hawk, has a shaft 170 feet deep. Sinking and stopping goes steadily on with a force of nine or ten men. A cord of mill ore per day is being raised, which runs from three to four ounces per cord. The Sleepy Hollow lode, on Bobtail hill, has a shaft 220 feet deep. Ore runs from eight to 11 ounces per cord, the mine is paying handsomely. Over \$170,000 in gold have already been taken out of the Annie mine, Summit district, San Juan. The Ida mine contains ore of almost exactly the same appearance, and there is every reason to believe will eventually produce ore equally as good.

MOUNT LINCOLN is at the present time producing more mineral and of greater value, in proportion to the number of men employed, than at any time since the first excitement over the discovery of her bonanzas. This is attributable to the fact that the recent uncovering of rich ore bodies has stimulated prospectors to renewed activity, and as a natural result many new finds have been made. This led to the location, re-location and leasing of much territory, and the active work now being done, followed by a large increase in the amount of ore brought down from Lincoln.

SILVERTON.—A great many mines are being successfully worked, and the amount of ore ready for reduction is now greatly in excess of last year. Green & Co.'s smelting works will be able to commence operations by the first or middle of April. It is their intention to increase the capacity of their works so that twenty-five tons of ore can be treated every twenty-four hours, and in consideration of the low price of lead they will add a refinery so that the silver can be sent out in solid bars and the lead etacked away until such time as the price will justify shipment.

LOWER SAN MIGUEL.—They hope to have a first-class hydraulic in operation by the first of June. Our mines look splendidly. Mr. Wm. Wheeler panned out \$25 from seventy-five pans of gravel the other day.

Oregon.

MIDDLE CREEK.—*Sentinel*, March 6: Work at these mines is progressing rapidly, and in ground sluicing gold is frequently seen with the eyes. They have very little dump, and considerable trouble is experienced on this account.

SOUTHERN OREGON MINES.—The Sterling started into full operation on the first of the month, and is going at full capacity. It has three hundred feet head of water the year through, and with two giants is sluicing away the mountain at a rapid rate. They will make their first clean up on the last of March.

THE BLUE GRAVEL MINE, on which \$100,000 has been spent, is now in full operation and working finely with excellent prospects. It

has a head of two hundred feet, and with two giants running, and forcing water through six-inch nozzles tears out tons of earth from the mountain side, which has been washed away until it presents a perpendicular front ninety feet in height. A clean-up will be made about the 10th of March.

THE ENGLISH MINE, after a temporary suspension on account of a break down, is working away at its fullest capacity. They have a head of three hundred and twenty-five feet, and run three giants. With these hydraulic hose, or either of the other mines, a stone of a ton weight is rolled aside as if it was a marble, and at three hundred and fifty yards the strongest brick building in the city would be swept down as if it were built of sand. The English company have made a clean-up, but the result is kept secret. There is no stock for sale in any of these mines.

News in Brief.

PIOCHE has a foot of snow. **THERE** were 91 deaths in this city last week. **BIRTHS** in New York last week, 522; deaths, 453.

THEY have had a very mild winter in Montana.

LOS ANGELES, is sending lots of fruit trees to Arizona.

MICHAEL REESE has left for an extended trip to Europe.

THE boys in Panama have commenced to shoot the Chinamen.

OMAHA sends eggs to San Francisco and Colorado butter to Chicago.

GARIBALDI will be the guest of Victor Hugo during the Paris Exposition.

THE masons' strike in England is ended, the men accepting the masters' terms.

EDDIE SCHREIBER died in Alameda, last week, from eating poisoned mushrooms.

THE late warm weather has brought out the young grasshoppers in Colorado.

THE law forbids killing quail in California until the 15th of September next.

THE Louisiana Supreme Court has ordered Thomas C. Anderson to be released.

AN unprecedented yield of grain is promised throughout nearly all parts of California.

THE Pennsylvania Legislature stupidly talk of enacting a law to prevent cremation.

THE London Times says American potatoes threaten to drive out the home-bred article.

THE first cargo of grain from the Black sea, since the raising of the blockade, has arrived at Falmouth.

THERE is a prospect that the Vulcan Iron Works in New York, now idle, will soon be started up.

AMERICAN car wheels, both for street and railroad cars, are now offered in the London market.

JOHN PETERS while on his way home from a carousal the other night in Bodie, fell into a shaft and was killed.

THE English government is taking steps to suppress the seditious utterings of the vernacular press of India.

IMMENSE numbers of beef cattle are being shipped for San Francisco from the Winnemucca station, Nevada.

NINETY-ONE deaths were recorded at the health office this week, against 93 last week and 97 the week previous.

ANOTHER million and a half is asked for the Brooklyn bridge, which will bring the expenditures up to ten millions.

THE Gila river is sending down a flood of water. This is owing to frequent rains in Arizona, a thing unusual at this time of year.

OUT of 25 smelting works formerly operating in Utah, only four are being run at present. The low price of lead is the cause of the suspension.

THERE were 129 failures reported in New York city during the month of January, the largest number of any one month since the panic of 1873. The liabilities amount to \$7,000,000.

THERE are about 1,000,000 operators engaged in the iron industries of the United States. The entire value of manufactured iron for one year is \$900,000,000.

THE storms of the last week extended over the upper Missouri valley, lasting three days. The snow on the stage road to Fort Buford is from one to 15 feet deep.

CROP prospects in Washington Territory are good. There will be no diminution of acreage in hops, while there will be a considerable increase in barley, oats vegetables and fruit.

THE French, German and Bohemian Socialist clubs of New York on Sunday evening celebrated the establishment of the Commune in Paris. Red flags, badges and roses were numerous.

STATE detectives at Tewksbury, Mass., have arrested a number of men on charge of living in open polygamy. An attempt is making to establish a polygamous colony at Tewksbury.

GUS JOHNSON, the murderer of a negro ferryman named Alfred, was hanged at Rome, Georgia, on Friday. A tremendous crowd was present. Johnson confessed to four murders.

THE Nevada bank is expected to open an office in New York the 1st of May. The managers have taken the suit of offices in Wall street lately occupied by the Merchants' Bank of Canada.

SISTER ST. CHARLES, of the Ursuline convent, in Brown county, Ohio, died recently. She was a daughter of Gen. A. S. Rosecranz. She has been an inmate of the institution for a number of years.

LOS ANGELES is sadly pestered with burglars. A **TURKISH** soldier fights for \$1.50 a month. **LLOYD BELL**, the murderer, has been sent to State prison for life.

THE Chinamen at Virginia City, Nevada, are building a \$750 Joss house.

JOHN KELLEY was taken to the Napa Insane Asylum recently.

MONTEREY county has one-fourth more land under cultivation this year than ever before.

JAMES HAMILTON, the distinguished marine painter, died in this city on the 13th inst.

JOHN MORRISSEY, the pugilist and member of Congress from New York City, is supposed to be dying.

THE wages of workmen in the Fall River (Mass.) factories have been reduced 15%, beginning April 1st.

THERE was a fox-chase in Kentucky. The participants were 50 men, 100 dogs and one fox. The fox escaped.

THE rainfall in San Francisco for the season amounts to 32.28 inches; for 1877, 10.59 inches, and for 1876, 29.40.

THOMAS KELL, a native of England and a pioneer of 1849, died at New Almaden lately, at the ripe old age of 84.

HENRY QUEEN, colored, native of Maryland, aged 60 years, was found dead in his cabin, near Oroville last week.

A GERMAN Count named Hasso, discouraged at the loss of his fortune, committed suicide by banging himself at Merced, March 12th.

THE number of fat cattle shipped, this year, from Winnemucca, will reach 25,000. A liberal increase over former years.

IT is estimated that Oregon will have over 6,000,000 bushels of wheat to export this year. The increase the last ten years has been rapid.

AT Kingston, Fresno county, Bonz Anderson, aged 21 years, was accidentally killed on the 13th inst., by the discharge of a shotgun, while hunting.

A PARIS letter says the Exposition buildings, upon the Champs de Mars, are rising with astonishing rapidity and great changes are wrought in a single day.

THE American Transfer Company is building, in Pennsylvania, two of the largest pump stations in the world, one at Carbondale and the other at Freeport.

A MLL has been introduced into the California Senate allowing James W. Marshall, the gold finder, \$100 per month for two years, provided he lives so long.

AN extensive deposit of gypsum has been discovered in the mountains north of Los Angeles. This is a valuable fertilizer and especially useful on alkali lands.

SAMUEL DUNCAN, a young physician, disheartened at his failure to secure practice, committed suicide, in this city, by shooting himself through the head with a pistol.

OF the 5,000 envelopes asking subscriptions to the Robert E. Lee monument, sent to citizens of Richmond, Virginia, only 38 have been returned, containing an aggregate of \$40.32.

THE 40,000 trout placed in Marlette lake on the summit of the Sierra Nevada, a year ago, have been making it specially lively for the fresh water shrimps, which are disappearing.

MONROE L. PIERCE, a well-to-do citizen of Los Angeles, committed suicide, last week, by shooting himself with a pistol. He had been divorced from his wife and took it much to heart.

C. W. TAPPAN, who kept a lodging house at Deadwood, Black hills, was shot and killed on March 14th, by a young man named Chas. W. Hunt. There was no provocation, Hunt being crazy drunk.

SECRETARY EVARTS thinks the reduction in salaries of Ministers will prejudice the diplomatic service. The Minister to England, he said, must pay \$30,000 to \$40,000 yearly more than his salary.

PATRICK J. MCGINN, a carpenter, out of work and disconsolate from the death of his wife, jumped from the wharf, last Sunday morning, and, though secured before being drowned, died soon after.

J. A. LINEHAN, formerly employed in the railroad ticket office in the Grand hotel, in despair at the loss of his savings in stock speculations, shot himself through the breast, on Saturday last, and died soon after.

THERE has been a heavy run on the Five Cent Savings Bank of Boston, which has 71,000 depositors and \$12,000,000 on deposit. All calls were promptly paid, the bank not insisting on the 60 days' notice allowed them.

ON receiving their pay the employees of the California mill donated the sum of \$293 to be used in assisting the sick and destitute of Virginia City. The employees of the Con. Virginia mill donated \$236 for the same purpose.

THE mother of Runk, under sentence of death, called on Governor Irwin, lately, and besought him to commute the sentence of her son. Despite her entreaties, the Governor told her that he must refuse to interfere, leaving little hope for his escape from the gallows.

COMMODORE GRAHAM died of apoplexy a few days since in New York. He was one of 12 officers who, during the last war with England, attacked Black Rock in the night, and nine of whom were killed or severely wounded, Graham being so hurt in the ankle that amputation became necessary.

ON the 8th of March, a snow storm commenced in the Black hills country, and continued until the snow lay five feet deep on a level and from 40 to 50 feet deep in the canyons. A great many houses were broken down, business of all kinds was stopped and a number of lives were lost. Much stock also perished.

A Murderous Plant—*Darlingtonia Californica*.

[By J. G. LEMMON.]

No plant indigenous to the Pacific coast is more profoundly interesting than our *Darlingtonia Californica*. The eye of the uncultured tourist or listless stock-man, no less than the studious naturalist, is at once fascinated when first its secret haunt is invaded in the fastnesses of the Sierra Nevada. A startling mass of green, yellow and crimson snake-heads, high raised in air and thrusting enormous, flaming, forked, curling tongues in every direction; a developed warning principle in the passive vegetable kingdom; a table-turner upon an old eternity-endured enemy; a coming plotter against an alert foe; an ingenious deluder of the unwary; a cruel murderer of the alarmed; an insatiate vengeance-taker; a bold, watchful, cold-blooded, confederated assassin—the *Darlingtonia* forms a frightful specter of the shadowy swamp, a horrid incubus of subsequent dreams!

"Abhorred shape! That only grace of beauty takes,
And brilliant hues to compass evil."

A Consummate Villain.

The paraphernalia which the *Darlingtonia* employs for attracting its victims is that of the saloon-keeper and the Cyprian gaudy colors, ravishing odors, delicious sweets and delightful apartments. Its machinery for destroying them is that of the highwayman and the arch fiend, deceitful traps, tripping obstacles for the feet, smooth declined planes, pointed dagger-thrusts from behind and silent wells of oblivious waters. What of enchantment and bewilderment is not furnished by the many-colored, revolutive, honey-coated mustache, inviting to the spacious, vaulted, sugar-lined, many-windowed hood of the large, tall leaves each robust plant provides extra by sending up a long, slender, shining flagstaff and suspending a flaunting array of green, gold and crimson bunting, loosely enfolding nectaries of scented sweets, the curious flower of the *Darlingtonia*. Surely no member of the vegetable kingdom has so remarkable and unmistakable a mission, none steps so far out of its normal state to perform it and none executes its trust with more ingenuity and success.

Modus Operandi.

How the *Darlingtonia* is constructed and the mode and results of its warfare have been made the subject of searching expeditions and elaborate essays by Darwin, Hooker, Gray, Canby, and recently by a fellow member of this academy, Harry Edwards. But I trust that an enthusiastic hotanist, whose facilities for observation have been most fortunate, may be pardoned for presenting a few facts, gained, not without many different interviews of this notorious rogue, at various seasons of the year.

Living less than 60 miles from one of the few localities where the *Darlingtonia* is found in its best estate—Butterfly valley, near Quincy—I make yearly pilgrimages to its home, I camp by its battle-ground, I conquer my repugnance to its hideous aspect and its cruel work, become accustomed in time to the stench of its rotting victims and I carefully study its wondrous mechanism. I note its aspects and appliances varying with the seasons. I feed it with other food—fish, fowl and farinaceous diet, sugar, vinegar, salt, pepper, oils, saleratus, acids, etc. I witness the welcome of agreeable diet, the sickening effect of poisons. I ply it with unusual captives—frogs, snakes, minnows, tadpoles—and note the arrival of new forces or the adaptation of combined powers to meet the new conditions. I recognize the tenacity of purpose, the almost intelligent use of means and reverently I humble my spirit before the revelation of infinite wisdom and power.

Thoughtful Inquiries.

I have reported these observations so often and fully, that every year brings increasing inquiries from thinkers in distant lands, asking to have this or that mystery cleared up; or to know if this or that phenomenon is connected with the history of the famous plant. One of the closest questioners is W. M. Canby, of Wilmington, Del. The facts elicited formed the theme of a most exhaustive essay, that was read before American Academy of Sciences and reprinted in most of the languages of Europe.

"Why are the Leaves Twisted One-half way Round?"

Was Canby's last demand. It will be the especial object of this essay to answer this question.

To discuss this subject thoroughly and with the expectation of arriving at the truth, we must begin where the zoologist does with his puzzles—with embryology, the infant state. The seed of the *Darlingtonia* is a brownish, hairy, Indian-club shaped object, about three lines long. It would be a bur, but for the flaccid, hollow, barbellous hairs. Thrown out in hundreds by the large, bursting pericarps, they fall upon the running water or mossy carpeting of the bog. A seed here and there is caught by its hair in favorable conditions and sends down a tiny radicle in search of a foundation, whereon to erect a unique charnel-house of many tall, feeding funnels. The precursor of the prospective phalanx of rapacious, cylindrical stomachs, is a very innocent looking little affair.

Infant Form of Leaf.

The plumule first develops a thin, flat, falcate, green leaf, about half an inch long. Soon it becomes reddened, tubular and veiny, while

a relatively large opening appears at about two-thirds of its length, beyond which extends, curving inward, the slender, dorsally flattened, crimson, naked midrib, representing the true leaf, of which the tube below is the petiole. Along the inner face of the petiole, a broad wing extends from the lower edge of the inclined orifice, down straight to the collum of the root, where it divides and clasps the stock.

This primary leaf is constructed similarly to those of the related *Saracenia*, except that in the latter genus the true leaf or lamina is short, broad, and is bilobed, or many lobed, and forming a border nearly around the mouth of the pitcher-like petiole. During the first season four of these simple *Saracenia*-like leaves appear of equal size generally, apparently in a whorl, but inspection reveals their alternate arrangement. All face inward, or rather upward, as the leaves first push out horizontally, then ascend upward. The uncovered opening is favorably presented for the reception of moisture, insects, or any objects obeying the law of gravitation. Also, the mouth parts and interior of the tube are armed with strong hairs, pointing inward, while inspection of the contents reveal minute insects (generally of the *Ichneumonidae* and *Tinninae* families), entrapped, drowned in water and being digested by these tiny rogues, thus early playing their little game.

The True *Darlingtonia* Leaf.

During the second year the creeping, rhizomatic character of the plant is manifested; also, it increases rapidly in size. The whorl of leaves now produced, from one-half an inch to several inches beyond the first whorl, are long and large, two to three inches long by half an inch wide, the whole striated with longitudinal veins, and colored with yellow and crimson. Often, too, the other kind of leaves make their appearance, forming one or more of the first members of the whorl. So very different are they at the very beginning, that it seems impossible that both forms should be found on the same plant. They may be larger or smaller than the infantile form (often but half an inch long), but still they will be perfect types of the true *Darlingtonia* leaf—the twisted petiole, the swelling, light, admitting hood, the small, round aperture facing downward, the enormous, depending, curling, flaming, and, in the season, honey-smeared two-parted lamina or true leaf.

The fourth year's leaves and all subsequent are all of the vaulted, big-mustached form—the plant is of age, is mature; but occasionally on offsets and runners from weak plants at any age, the infant form of leaf is found, but no graded, transitional stages have yet been detected, though much research has been applied in this particular direction, as bearing upon the popular theory of evolution. The linear, strict petiole, with upturned mouth and long, naked, midrib, always accompanies the infant form, while the adult leaf is never deficient in the least characteristic feature of its wondrous organism.

I should have noted before the manner of veneration or budding. In the bud, the petioles of both kinds of leaves first take form and extension. The midrib of the infant is but a minute, subulate spur; the future mustache of the adult form is a pair of involuted, close-rolled, awl-shaped horns, not unlike those waxen pilose appendages which the incipient dandy sometimes displays beneath his nose.

The Saccharine Secretion.

Not at all times of the season is a prominent characteristic observable. For several years I did not detect one of the most distinctive features of this insect trap, the saccharine secretion. This phenomenon was not certainly known for several years after the discovery of the plant. On the 4th of July, '75, in company with Mrs. Austin and family, I went to celebrate the nation's holiday beside our peculiarly Californian curiosity, located in a large oval bog in the center of a grove of alders. Much to our surprise, the tall, crowded cobraheads, upreared among snowy *parnasias*, azure *erigerons*, yellow *nartheciums* and purple asters appeared, dripping with glistening drops of honey. The catching operation was in full progress.

This saccharine fluid, of the consistence of honey, is secreted by glands of the hood, both without and within, standing in beads along the margins of the expanded cells, the translucent windows of the balloon-like hood. It is often so abundant as to unite and flow down, that on the inside into the forward, depressed part of the hood, that on the outside smearing the mustaches completely, in addition to a similar secretion of the latter. Not only was the curling, crimson-streaked mustache smeared throughout, but the border of the wing in its spiral curve half-round down to the root was gemmed with a line of honey globules. These globules in the oldest leaves were crystallized into sugar-plums, forming a not-to-be resisted decoy to the grounding below.

The Waters of Death.

So of the watery fluid found in the lower portion of the petioles at times. Only at a certain season—just at the opening of the months above, may this phenomena be detected. The main veins on the inside of the tubes may then be seen gemmed from top to bottom with beads of a water-like secretion, which finally becomes so abundant as to flow down and form the wells of death. When the trap is favorably placed, or the quantity of insects is unusually large, so that the gormand gets his stomach full, or when fed by hand to the top, slowly, with flesh food, the fluid is secreted as demanded by the necessities of the case, and soon fills the tube to overflowing. Late in the season the water is evaporated and only the skeletons, wings, legs,

etc., of insects remain—the bones of the carnal feast.

Again the arrangement and different altitudes of the leaves are not at once observed—and cannot be made out clearly from the usual crowded specimens supplied to the herbariums of the world. Only young, vigorous, solitary plants display the typical plan of growth—a plan conformed to the wants, or rather, the wicked designs of the *Darlingtonia*; and here we are brought round to the solution of the question under particular description—

Why the Twisting Leaves?

First as to the facts. The leaves of mature rhizomes—the true *Darlingtonia* leaves—are each twisted one half way round whatever the length, whether one half inch, or over three feet. All the leaves on one plant turn one way, but exactly half (according to repeated counts by Mrs. Austin and myself,) have leaves turning one way and half the other. The four leaves of the season rise successively to different elevations, the last in time, to the highest place. Each turns half-round and holds out its flaunting lures into space in a direction radiating from the center or axis of the plant. The reason for this twisting of the petiole must be to further the design—the malicious animus of the whole plant's history, to favor the catching of insects coming from all quarters.

The less crafty-related *Saracenia* and the infant *Darlingtonia* leaf depend on gravitation mainly, for their food, and their mouths bordered indeed with retrorse hairs open upward. The full-grown, full-armed *Darlingtonia*, with its added attractions of gay colors, fragrant odors and delicious sweets, best compasses the wholesale capture of insects necessary to satiate its rapacity, by decoying them into a brilliantly lighted chamber, over the ceiling of which are spread a net-work of boneey path-ways, bordered, however, and ultimately shut out by hedges of short, stiff hairs that topple the victim from his footing. A high rim prevents return by the aperture. A long portion of the inner side of the tube, commencing just on a level with the edge of the orifice, is smooth as glass, so vainly the poor victim stretches his legs for rescuing aids to stay his descent. About half way down long, stiff, declined hairs begin to be met with, which give way easily from above but close up behind, and with multiplied numbers, as the struggling victim nears the goal, pushes him down to the rising flood, and crowds him beneath the silent, fetid, decomposing waters of oblivion.

Now, why the peculiar characteristics of the *Darlingtonia*? Why would not less elaborate machinery answer as well? Let us see: A tube so capacious as to hold a half pint of insects, the usual meal it seems of the *Darlingtonia*, must be very wide or very long. If wide, there would be great expenditure of the saccharine secretion, since it must surround the mouth and smear all the approaches—an expenditure not to be incurred by our economical plant. If long and prostrate, it would be interfered with by other plants, also would be in danger of visitation and robbery by insect-loving animals. If upright and with mouth upturned, it would be above the usual range of insects, while its digesting fluid would be weakened by the reception of rain and dew; but, most of all, other plants are created and set to work on this principle: The wonderful climate and soil of California must be expected to produce a finished insectivorous plant, with all possible improvements; hence, the matchless *Darlingtonia*, with its high reared, inflated heads, downward opening mouths, sugar plum winding roads to lead foot travelers up; ingeniously, brilliant and honey-coated decoys to attract flyers; and the enormous mustaches obviously turned outward by twisted petioles to catch the eye of distant voyagers in every direction; no feature of all the host is either accidental, useless or uninteresting.

[The above fascinating and accurate description of this famous plant was written for the Academy of Sciences. We are glad to know that Prof. Lemmon is now at work on a course of three lectures on the conifers of California, and we are confident that they will be of exceptional interest and excellence; first, because of his full acquaintance with his subjects in their habitats; and, second, from his brilliant and vivacious style of expressing his facts and ideas. We hope these lectures will be widely heard, not only on this coast, but beyond the mountains.—EDS. PRESS.]

THE SOURCE OF ITS SALTINESS.—It was long supposed that the brackishness of Salt river, Arizona, was caused by the stream running over a bed of salt somewhere along its course. Its waters are pure and fresh from where it heads in the White mountains to within 50 miles of where it empties into the Gila. Fifty miles from its junction with the Gila there comes into it a stream of water that is intensely salty. This stream pours out of the side of a large mountain, and is from 20 to 30 feet deep. It is very rapid, and pours into the Salt river a great volume of water. Here could be easily manufactured sufficient salt to supply the markets of the world. All that would be necessary would be to dig ditches and lead the brine to basins in the nearest deserts. The heat of the sun would make the salt. Were there a railroad near the stream its waters would doubtless soon be turned and led to immense evaporating ponds. It is supposed that the interior of the mountain, out of which the stream flows, is largely composed of rock salt.

THE ENGINEER.

Americans Dredging a Ship Canal in Russia.

Mr. Levi Hayden, for several years past superintendent of the Morris & Cummings Dredging Co. of New York city, has started for St. Petersburg, Russia, to commence, for the company he represents, the construction of machines and sews preparatory to dredging a great sea canal through the lagoon which separates Cronstadt, the chief naval depot of the empire, from the national capital. This important work, says the *Iron Age*, is under a contract with the Russian government, whose commissioners at the Centennial observed the American methods of dredging, and now adopt them in a public improvement which may have no ordinary political and commercial significance. The contract requires that excavation shall commence by the first of October next, and the entire work be finished in 1883, though it is not possible to operate the machines more than six months in the year on account of ice. The sum of \$25,000 in gold has already been deposited in St. Petersburg by the contractors, as a pledge of good faith. The width of the canal is 280 feet, depth 20 feet, length about 10 miles. A leading feature of the improvement is the building of a "commercial port" near St. Petersburg (with a central basin, while the whole is environed by smaller basins for smaller craft), whence a line of railroad and parallel canal will extend to the river Neva, intersecting in their course all the great lines of railways connecting St. Petersburg with the south, the whole forming a single system of internal communication, which is regarded as showing extraordinary sagacity in its conception. One Pooteloff by name takes all the honor. When all is finished, naval vessels can easily pass from the sea almost to the suburbs of St. Petersburg, barges from either the Volga or Neva can at the same time pass down to Cronstadt, and all the railroads have increased facilities for moving their freight. The engines and some of the machinery to be employed will be built in the United States. The contract as it now stands is for the removal of 3,750,000 cubic yards of mud, but the total is likely to be increased to 7,500,000 yards. The dredges are called the "clam-shell dredge," like those frequently seen at work in the New York docks, being armed with powerful iron jaws which close upon each other when filled.

WAVE POWER AND MASONRY.—A remarkable instance of effect of sea waves on masonry, says the *Iron Age*, is furnished in the case of the well-known breakwater at Wick, on the coast of Eogland. The height of the waves at this place was, it appears, several times measured and estimated, the result showing about 42 feet from crest to hollow. Stones of eight and ten ton weight were, by these waves, carried from the parapet to the very top of the breakwater; and it was therefore determined, finally, to construct the outward extremity of the breakwater by depositing three courses of one hundred ton blocks of stone on the rubble base, as a foundation for three courses of large flat stones, surmounted by a monolith of cemented rubble built on the spot. The end of the breakwater, therefore, was in substance a monolith weighing upward of eight hundred tons, being about twenty-six feet by forty-five, and not less than eleven feet in thickness, cemented to the underlying rubble base. Incredible as it may seem, this huge monolithic mass succumbed to the force of the waves—it was, indeed, actually seen by the resident engineer to be bodily slewed around by successive strokes until it was finally removed and deposited inside the pier. Not only the upper portion, but the three lower courses of stone, forming a mass of 1,350 tons, was removed without breaking.

CHEYENNE TO WASHINGTON TERRITORY.—A bill recently introduced in Congress proposes to incorporate the National Pacific Railroad and Telegraph Company, with \$35,000,000 capital, to run from Cheyenne via Fort Laramie to Deadwood, and also via Fort Laramie and the Yellowstone, to Helena, Montana, and thence to the Pacific ocean, on the coast of Washington Territory. The bill grants right of way, use of public timber, etc., authorizes the issue of \$25,000 mortgage bonds per mile, and exempts the property from all taxation for ten years after completion. Work will be commenced within one year, and run at not less than 50 miles per year until the main line reaches Helena.

THE ST. GOTHARD TUNNEL.—The Cologne-Minden and the Bergisch-Markische railway companies, which have granted a subsidy of 1,000,000 frs. each for the St. Gothard railway, have refused to pay any further sum for that project. Altogether, Germany is interested in the St. Gothard railway to the tune of 20,000,000 frs., 8,000,000 being contributed by the Empire 2,717,000 by Baden, 1,500,000 by Prussia, 2,717,000 by the Alsace-Lorraine railways, etc.

A BRIDGE across the Nile at Mansura, designed by Alfredo Cottan, of Naples (who has built over 1,000 metallic bridges at Italy and the East), is partly of stone and partly of iron—"a combination of the suspension principle, with straight girders."

USEFUL INFORMATION.

Some Facts about Soap.

The true soaps, says the *Journal of Chemistry*, are all salts of potash and soda, the former being soft soaps, the latter hard soaps; but these fatty acids unite with other alkalies and bases to form insoluble compounds, which are also often called soaps. If we mix a solution of common soap (containing stearate of soda, we will say) with one of lime, the soda salt is decomposed, and a stearate of lime is separated in an insoluble form. This reaction is a common one in the chemistry of the kitchen, though not a popular one with housewives. It takes place whenever soap is used with "hard water," which owes its bad name to the presence of salts of lime, magnesia, etc. When soap is dissolved in such water, the lime of magnesia unites with the stearic acid to produce the insoluble curdy flakes which appear. It is not until sufficient soap has been added to decompose all these salts and dispose of their bases that it becomes available for its legitimate business of cleansing. The harder the water, the more soap is wasted in this vexatious chemical process. If one has no hard water at hand, he can illustrate the reaction by dissolving a little Epsom salts (sulphate of magnesia) in water, and then rubbing some soap in the solution, or pouring some soapy water into it. The froth of the soap will vanish, and curdy flakes will be formed. The sulphate and the soap (call it a stearate of soda) have "swapped" bases; sulphate of soda is dissolved in the liquid, and insoluble stearate of magnesia is left floating as the white flakes.

Soap is always an alkaline or basic salt, and its detergent power depends on the degree of its alkalinity. The more nearly the soda is neutralized, the less capacity it has for combining with the grease and other matters which it is intended to remove. Of course this property in soap must be graduated to the purpose for which it is to be used. For the coarser work of the laundry, the ordinary bar soap, which is quite alkaline, or soft soap, with its more active potash, is required; while for toilet use an almost neutral soap is wanted, as the other would not only remove the impurities from the skin, but partially dissolve the latter, leaving it rough and uncomfortable.

Firewood to the Acre.

In a good deal of observation on the subject, says Marsh, the largest quantity of marketable wood I have ever known cut on an acre of virgin forest was 104 cords, or 493 cubic yards, and half that amount is considered a very fair yield. This estimate is far above the averages given to the statistician of our department of agriculture, which are as below:

In Franklin county Me., the best woodland yields forty cords per acre; the average is about twenty-five. In Sagadahock and Hancock counties the average yield is thirty cords per acre.

In New Hampshire, the average yield is put from twenty to forty cords per acre in the different counties.

In Vermont, the forests yield from twenty-five to fifty cords per acre. Some forests are estimated to furnish 200 cords.

In Rhode Island, about thirty cords per acre. In Connecticut, sprout lands yield about twenty-five cords per acre every twenty-five years.

In New York, from thirty to sixty cords per acre. The original forests in some of the counties are estimated at sixty-five cords.

In Delaware, well-set second growth woodland yields thirty to forty cords per acre.

In Maryland, from thirty to forty cords, etc.

In Oregon, however, among the evergreens and oaks, the yield seems perfectly astounding. In Douglas county there are thousands of acres which would yield from 300 to 600 cords per acre. Oak-timbered lands yield an average 100 cords per acre. Says the annual report of the land office, in relation to this land, "it will produce from 25,000 to 300,000 feet per acre," and "there are vast tracts that would cover the entire surface with cord wood ten feet in height." The report speaks of forests of pine trees "from one to fifteen feet in diameter, and 200 to 300 feet high," and red and yellow pines of gigantic growth, often attaining a height of 300 feet, and from nine to twelve feet in diameter.

THE COMPOSITION OF CIGARS.—Let every honest smoker take courage. Cigars are not made out of cabbage leaves. The British government discusses the subject of tobacco adulteration in a big blue book, which contains a tabulated account of the seizures of the spurious article made in the United Kingdom since 1864, and in the whole volume there is no mention of the cabbage blossom. But there are many suspicious things among the ingredients, as the abstract in the *Pall Mall Gazette* shows. The first sort is required for the actual substance of the cigar; the second for improving its outward appearance; and the third for imparting to it what is supposed to be a better taste. In the former category the favorite substance seems to be the leaves of the lime-tree, the husks of wheat and oats, cotton, yarn, and tonquin bean. But there are numerous cases where the ingredients have been much more curiously selected, and have included cocoanut fiber, small seeds, cotton, wood, and bread. At one establishment, fifty pounds of tobacco dust were found and analyzed, when it was shown to contain string,

wood, nails, grindings of tobacco-pipe, dirt, and all sorts of refuse. Another large class of materials is apparently used for securing the adhesion and consistency of the cigar when made. Amongst these, starch is the most prominent; but it includes gum and amidine, blue, gum arabic, glue, glycerine, and essential oils. The color of the fabrication is the next thing to be attended to, and for this purpose resort is had to yellow ochre, red sandalwood, logwood, lampblack, and Venetian red. As for the flavor of the cigar, it is varied to suit the most diverse tastes; but the usual object seems to impart to it a pleasing sweetness of tone. Accordingly saccharine matter, and especially treacle, is very largely pressed into the service. For those who like a rather more decided taste, liquorice, salt, logwood, glycerine, and aniseed are used.

BLACKBOARD PAINT.—The following is a good recipe for blackboard paint: One quart of shellac dissolved in alcohol, three ounces pulverized pumice stone, two ounces pulverized rottenstone, four ounces lampblack; mix the last three ingredients together, moisten a portion at a time with a little of the shellac and alcohol, grind as thoroughly as possible with a knife or spatula; after which pour in the remainder of the alcohol, stirring often to prevent settling. One quart will furnish two coats for 80 square feet of blackboard not previously painted. The preparation dries immediately, and the board may be used within an hour, if necessary. No oil should be used. Should it not be convenient to make this preparation, liquid slating may be purchased, ready prepared.

STOVE BLACKING.—The following recipe for imparting to stoves a fine black polish, which will neither burn off nor give out an offensive smell, will prove acceptable to some of our readers. Lamp-black is mixed with water-glass (a solution of silicate of soda) to the consistency of syrup and applied with a brush as a thin and even coating, then left 24 hours to dry. Afterwards graphite, or black-lead, mixed with gum-water, is applied, and a polish obtained by rubbing in the usual manner.

BLACK WALNUT STAIN.—The following, from the *Journal of Chemistry*, is a simpler recipe than the one we recently published and is said to be equally good. Take a pint of very thin glue, its adhesiveness being just perceptible, between the thumb and finger. Put into it a tablespoonful of raw umber, stir it well and put on warm with a sponge or brush. When dry, brush off and varnish. Another is to take one tablespoonful of Venetian red and half a teaspoonful of lamp-black, mixed into a paste and then diluted with the pint of glue water as before.

MUCILAGE OR CEMENT.—The *Journal de Pharmacie* states that if to a solution of gum-arabic, measuring eight and one-third fluid ounces, a solution of 30 grains of sulphate of alumina, dissolved in two-thirds of an ounce of water, be added, a very strong mucilage is formed, capable of fastening wood together or of mending porcelain or glass.

GEM FILTER.—Dr. Angus Smith finds that cotton wadding between two layers of cotton cloth is an effectual filter for fungus spores in the air, and that even flour paste, left in an enclosure of such material for days, developed no fungi whatever.

RAPE OIL FOR IRISH LIGHTHOUSES.—We read in English exchanges of the making of a refined rape oil for the Irish lighthouses.

GOOD HEALTH.

Notes on Sanitary Building.

This subject is of importance to all home makers. In Dr. Buchanan's special inquiry, the various registration districts in the three southern counties of England, beyond the limits of the metropolis, were brought under detailed examination and the conclusion was reached that soil-dampness is a most potent cause of consumption.

Some writers believe that soil-dampness is the cause of many other diseases. Dr. Bell, in his report on the drainage of Kings county, N. Y., as reviewed by the *Independent*, expresses the opinion that not only consumption, but intermittent and remittent fevers, rheumatic affections, neuralgia, croup, quinsy, diphtheria, pneumonia, pleurisy, bronchitis, cerebro-spinal meningitis, erysipelas and diarrheal diseases owe their origin in a great measure to this cause.

These considerations indicate the importance of living upon a dry soil, and make it obligatory upon any community whose territory is waterlogged, either wholly or in part, to drain such territory of its surplus water.

By surplus water is meant that which is not held in the soil by capillary attraction; all that water which would run away from a quantity of earth placed in a barrel with holes in the bottom. Such drainage can be easily accomplished. Unglazed tiling, with joints carefully protected, laid at a depth of three or four feet, with proper inclination, and at suitable distances, will drain any soil, however wet, in less than 24 hours. To ascertain whether a given locality requires draining, let an excavation be made to the depth of three feet, and, if water is found in it 24

hours after the heaviest rain, the locality is unfit for human habitation.

The site selected for a house should be thoroughly drained to a depth at least a foot below the bottom of the cellar; and the foundation should be so constructed that the storm-water which dashes against the house and the water which accumulates in freshets in its vicinity should be arrested and conducted away. This can be done by sinking the foundation-wall a foot below the cellar-bottom, placing a tile-drain outside of this, filling the excavation below the cellar-floor with concrete, building the cellar-wall of brick and covering the outside of this wall with some material impervious to water. It would be well to place above the drain, reaching to a point near the surface, a quantity of coarse gravel, to allow the water more easy access to the drain. If the land be at all springy, there should be, in addition to this outer drain surrounding the foundation, several cross-drains, all of which may have the same outflow.

What Comes of Overwork.

Before the New York Neurological Society recently, Dr. A. Hammond read a paper on "Cerebro Hyperemia." This, he said, is quite a common disease, and was brought on generally by over-intellectual exertion. The symptoms are vertigo, noises in the ears, dark spots before the eyes, a staggering in the walk, numbness in the limbs and twitching or spasms in the face. There is a mental disturbance which is shown by hallucinations, and principally by sleeplessness. The digestion is impaired. These are the symptoms in violent cases. In general, the person is deprived almost wholly of sleep, or has unpleasant dreams. He finds it impossible to fix his attention on any subject, and is attacked by a pain in the head if he makes a mental effort. An accurate accountant who was attacked by this disease could not add up a column of figures, making mistakes which in his normal condition he would consider ridiculous. In one case reported a gentleman attempted to commit suicide because he could not solve a simple sum. The patient is forgetful of names and faces, and makes mistakes in using words. There is, too, a great deal of indecision manifested in simple matters.

The cause of cerebro hyperemia is mental. A young lady was once attacked by it in consequence of an intense intellectual effort she put forth to solve a mathematical problem. The disease is more apt to attack those in middle life than the young or old. To be cured the patient should abstain from severe mental work, and should exercise in the open air, indulge in moderate gaiety and a plain but nutritious diet.

NOTES ON DIGESTION.—In a recent lecture in London, Prof. Garrod gave an account of some of the processes of digestion. The action of the saliva and of the gastric juice was demonstrated experimentally. Saliva, he pointed out, does not affect albuminoids, but it does affect starchy foods, and the conversion of starch into grape sugar by saliva was shown in test tubes. This is now believed to be the only chemical part—the work of digestion—the saliva performs. The nature of the work of the gastric juice was shown by some which had been obtained from the mucous membrane of the stomach of a lion, recently dead. Albumen, fibrine, and casein cannot dialyse through the walls of the alimentary canal till the pepsine of the gastric juice has converted them into peptones. After dialysis, it is believed the peptones again are changed to albuminoids, but it is a curious fact that though albuminoids can be artificially converted into peptones, the peptones cannot be artificially reconverted into albuminoids. The use of artificially made pepsine is of great service to people of weak digestive power, and Prof. Garrod drew attention to Mr. Bullock's process, by which an "acid glycerine of pepsin" is obtained from the stomachs of pigs, and has been found by medical practitioners to be of great value.

PLEA FOR PURE AIR.—A few well-known facts will show the urgent necessity for pure air. The longest period of time upon record in which a man lived without food and water is about fourteen days. If water be given, but no food, life may be sustained longer than this; but deprived of air, human life may be extinguished in three minutes. This serves to show, in one way, and in a prominent manner, the high value of ventilation. Human life may be continued for a time by bad air, stagnant water, and decaying food; but without pure air, good water, and wholesome food, life soon loses all its freshness. Most persons make great exertions to obtain good water and sound food; but unfortunately, there is not often the same regard paid to the condition of the air. Is ventilation then of no importance? Should it not be studied by the statesman and the philosopher as well as by the physician?

REMEDY FOR FACIAL NEURALGIA.—Dr. Luteu, of Rheims, states that he has obtained excellent results from the cyanide of zinc in rheumatic facial neuralgia simulating cerebral rheumatism. He relates two cases in which, with intense facial neuralgia, there was continued and ardent fever, cephalalgia and tenderness, on pressure at the points where the nerves emerged. The symptoms rapidly abated under the use of the following mixture: Cyanide of zinc, one-fifth of a part, distilled cherry-laurel water, 25 parts, and tragacanth mucilage mixture, 100 parts. A tablespoonful, from hour to hour.

NEW ZEALAND RAILWAYS.—Mr. Carnthers, Engineer-in-Chief for railways in New Zealand, reports that at the close of June, 1877, there were 860 miles of railway opened for traffic in that colony, and 274 miles in progress, which are expected to be completed in 1877-78. In comparing this with the other colonies we find that Victoria comes next in its length of lines, having at the end of last year 702 miles open for traffic, and 259 miles more in progress, while New South Wales had only 509 miles opened, and 180 miles in course of formation. By adopting a gauge of 3 feet 6 inches the New Zealand government has not only been able to construct its lines with greater speed than the railways made in Victoria and New South Wales, which have wide gauges, but it has also been able to make them at considerably less cost. In New Zealand the expenditure on the 860 miles of railway in operation has been £6,129,920, or an average of something over £7,277 per mile, while in New South Wales the average is £15,699, or more than double, in Victoria £21,354, in South Australia £8,480, and in Queensland £10,633 per mile.

THE IMPROVEMENT OF THE MISSOURI RIVER. The report of Charles R. Suter, major of engineers, who has charge of the improvements of the Missouri river, and under whose direction a survey of the river at and above Atchison, Kas., has been published. He says that there are impending changes in the channel of the river at that point which threaten to destroy the railroad bridge there, or render the draw span impassable for steamboats. There is on the Missouri side of the river a chain of lakes, and it is feared that, owing to ice gorges or some cause, the river may break through into these lakes and abandon its present channel. Another danger lies in the fact that just above Atchison a narrow neck separates two bends in the river, which is liable to be washed out. The greatest danger, however, lies in the fact that the Missouri shore in the bend just above the bridge is rapidly caving, threatening the bridge. Major Suter recommends that this bank be protected as soon as possible, and estimates the cost of the improvement at \$56,000.

POSTAL TELEGRAPHS.—The total amount expended on account of the English Postoffice telegraphs up to the 31st of March last, was £9,845,278. The working expenses in the year amounted to £1,328,315, and the revenue was as follows: Message receipts, private wire rentals, etc., as per finance accounts, 1876-77, £1,298,558; value of services rendered to government departments without money, £13,846; extra receipts, £15,911; as per telegraph appropriation account, £14,549; old materials sold by office of works, £27; waste paper sold stationery office, £1,335; total, £1,328,315. The expenditure is inclusive of £23,000 paid to railway companies in respect of their telegraph rights, and £11,000 paid officers of the late telegraph companies in respect of annuities, and also inclusive of arrears paid to railway companies in respect of message work and maintenance of the telegraph plant, whereby the expenditure proper to the year has been exceeded by £61,786.

SUSPENDED RAILWAY.—An English journal illustrates a proposed system of suspension railway in which the rails are supported by strong wrought iron clips suspended from brackets projecting from upright columns fixed on the outer edge of the pavements in streets, while the cars are also suspended from the rails by means of steel carrying rods descending from the axles of small traveling wheels. Either horse or steam power can be used, the engine being suspended in the same manner as the cars. Among the advantages claimed for it are that the roadway is not cut up, and that the resistance to draft is materially reduced.

CARQUEZ STRAITS.—Several of the writers, says the *Alta*, who have undertaken to enlighten the public about the measure necessary to protect the Sacramento-San Joaquin valley against floods, assume that the Strait of Carquez is not wide and deep enough to carry off the waters. This is a mistake. In 1861-62, when November brought four inches of rain, December nine and a half, January 24, and February seven and a half, making 45 inches in four months, with simultaneous floods in all the streams tributary to the Golden Gate, the waters of Suisun bay rose very little above the ordinary level of high tide.

A HINT TO NATURALISTS.—Two processes of preserving fish from decay were detailed in a recent communication to the Paris Academy of Sciences by R. M. d'Amelio. The first process was as follows: The fish, whether raw or cooked, is immersed in a strong solution of citric acid in water. After two or three hours, the fish is taken from the bath and dried in the open air, or by artificial heat, the latter course being preferable. Fish so prepared will keep fresh anywhere for years. To restore its original flexibility, it must be steeped in fresh water four or five days. The other method consists in the employment of a bath of silicate of potash and glycerine, in equal quantities. The fish, the intestines having first been removed, is steeped in this bath for a day or two, washed in fresh water and dried slowly. By the use of this process the author has succeeded in preserving intact the color of the fishes and the eyes.



W. B. EWER.....SENIOR EDITOR.

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Saturday Morning, March 23, 1878.

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The Week.

Not since the winter storms set in, clogging the wheels of business, and bringing loss and disaster to so large a portion of the State, has business of all kinds shown such a marked improvement, and the general aspect of affairs so amended as during the past week. While the severe and long protracted storms have furnished our miners with an abundance of water for present purposes, and, in the snows that have accumulated on the mountains, laid up stores for future use, the returning fair weather has set the farmers to work with renewed diligence and put new life into all our other industries. The waters that inundated so large a portion of the Sacramento valley have nearly subsided, the crops of both grain and grass are everywhere growing rapidly, the fruit trees are putting forth vigorously, many of them being already in bloom, the orchards, vineyards, and gardens giving promise of abundant yield, and the grain fields, of a most prolific harvest. It looks now as if a full crop is likely to less concern our people than a profitable market.

Neglected Source of Gold Production.

In reply to letters received by us the past week, making inquiry as to the auriferous tailings deposited in the rivers and canyons of California, the localities and modes of their occurrence, etc., we may say that, while there is in the aggregate a vast amount of this material, but little of it, comparatively speaking, is so situated as to be economically available for gold extraction. The most extensive deposits in the State, are to be found on the main Yuba, on Feather and on Bear rivers, including the upper and larger tributaries of the latter; also, along the bed of Slate creek, Sierra county; in the vicinity of Cherokee and North Columbia, Nevada county, and along Indian and Shirt Tail canyons, in Placer county, there being deposits of more limited extent at various other points throughout the central and northern mining counties.

To begin our examination with those furthest north, we find the deposits in Slate creek basin to be some 8 or 10 miles in length, over 100 feet in average width, and ranging from 10 to 50 feet in depth. They are known to be rich in gold, though we are not informed as to their exact value, and can be run out by cutting a sluice-way through the bedrock which, rising up in the channel of the creek, has prevented their being carried off by the force of the water. Such a channel could be cut at a moderate cost, and as there is ample fall below this impediment to dispose of all the waste material, this basin seems to offer great inducements for the inauguration of an enterprise directed to the re-washing of these tailings. A company was formed for this purpose several years ago, but what they have since accomplished we are unable to say, further than they appear to have secured possession of a large section of the basin, and have, we believe, perfected a title thereto. With the vast quantities of this mining debris that have settled in the channels of the main Feather and Yuba rivers, nothing, for want of fall or outlet, can ever be done; and, even if there were such facilities for moving it, this debris is here of too low grade to warrant re-handling by any of the methods or instrumentalities now in use. Being remote from the mines, the most of the gold has found places of lodgment before reaching these points, or settling along these stretches of the rivers, it has here been intermixed with and buried up under the vast masses of barren alluvium brought down with it from the hydraulic mines, rendering its recovery nearly impossible. Forming extensive tracts of new soil, it may one day become valuable for agricultural purposes, but hardly ever for gold washing. To the Cherokee, North Columbia, and, in fact, many other minor deposits in the State, the above remarks will partially apply, the great trouble in these cases being an insufficient or total absence of fall below them to admit of their being run off. Out of this difficulty another one has grown. With so little fall, much of the light and worthless sediment has settled here, rendering the quality of the stuff to be re-handled comparatively poor. Only where the beds of these streams have sufficient descent to cause the water to flow with a rapid current, and thereby carry off the poorer material, will this debris pay for working over.

On Bear river and its main branches the quantity of these slums is enormous, besides being for the most part of good quality, that is, for a considerable distance below the mines, this material always growing poorer as we recede from the sources of its enrichment. Now, while Bear river has enough descent to carry on the necessary concentrating process, there occurs nowhere in the vicinity of the mines enough fall in its own bed to admit of the great mass of this stuff being re-washed. Running nearly parallel with this stream, however, and separated from it by only a narrow ridge, is the North Fork of the American, the bed of which lies nearly 1,000 feet lower than that of Bear river. A tunnel through this ridge would afford means for passing out the tailings from Bear river and discharging them into the North Fork, which being a deep, rapid stream, would carry them readily away. Some four or five years ago a San Francisco company undertook this work, and would have carried it through but for the difficulty encountered in securing title to the ground, it having been their purpose to clean out the main channel of Bear river and all its upper branches. The project was a grand one, and if those parties had aimed at less they would no doubt have been able to accomplish more. The great trouble has always been just this which defeated their aim, and which explains why these rich, gold-bearing slums have not been utilized before. All this ground, covering, on the upper Bear river and its tributaries a linear space of more than 30 miles, was originally taken up in small claims, to which the locators held on under the impression that they ought to receive a large price for their interests, though well knowing that nothing could be done with them until aggregated into large claims.

When capitalists or their agents sought to get hold of a section of the river for working purposes, the old miners, who were thoroughly posted as to the amount of gold these tailings contained, demanded such extravagant prices for their claims as discouraged those parties from prosecuting negotiations beyond the merest preliminaries; and not until recently have capitalists been able to consummate purchases of these exceed-

ingly valuable properties on satisfactory terms. Having pursued this dog-in-the-manger policy for so many years, these early claimants have at last shown business sense enough to dispose of their locations at something like reasonable rates. That they persisted so long in this course was due to the fact that, they having had ocular proof of the manner in which this material had been enriched, put a higher commercial value upon it than did anyone else; they being conscious too, of the fact that, while there was any quantity of this stuff lying along the beds of the rivers and gulches, only very little of it existed under conditions that imparted to it any practical value.

During the past summer another company was formed for consummating the scheme before alluded to, and which, being composed mostly of practical miners and parties owning the ground intended to be operated upon, has been able to perfect their title to a section of Bear river reaching from the town of Dutch Flat to a point five miles below. Having in a late number of the PRESS described the property and operations of this company, it will be unnecessary to repeat the same here.

It remains, however, for us to mention one or two other localities in which these auriferous slums occur in considerable quantity, and, at one, at least, under conditions more favorable for cheap and efficient handling than at any other point in the State. This is Shirt Tail canyon, a deep, narrow ravine on the Forest Hill divide, Placer county, where the tailings are exceedingly rich, tolerably extensive, and capable of being moved without any great expenditure of time and money. Several years since, four or five miles of this ravine were bought by some San Francisco capitalists—the late Wm. C. Ralston being a large owner, and to whose estate most of the property still belongs. Active measures were in progress for working it at the time of Ralston's death, which event, having put a check to them, they have since remained in suspension. A party of energetic business men having got control of this property, will proceed to open it up as soon as the water falls sufficiently to admit of their doing so. All that is required to run out the tailings from this canyon, is the cutting down of a few hundred feet of bedrock at the lower end, to the existence of which their retention is due. Without this barrier, no tailings could have made permanent lodgment in this gulch, which is so steep and narrow that the winter floods would otherwise have swept them into the American Fork, of which it is a affluent.

We are not advised as to the amount of money required to open and outfit this property, but it would be inconsiderable as compared with that needed to put through the Bear river scheme, which necessitates the construction of a two-mile tunnel. The great obstacle to the successful prosecution of all these projects, where at all plausible, has been, as before explained, the trouble of obtaining title. This difficulty has been effectually overcome in the case of this company, who have secured for their property a United States patent.

What has rendered the tailings along Shirt Tail canyon of unusual richness, is the fact that it has considerable descent, causing the water to carry off all the lighter stuff, leaving the gold behind. We believe the experts who examined these tailings estimated that they would yield about \$1 to the cubic yard, and that there were some five or six millions of cubic yards available for gold extraction. The Bear river tailings are supposed to be worth about 50 cents per cubic yard, those of the Slate creek basin being estimated at about the same.

Better Stop Nearer Home.

Whatever the inducements the Black Hills region may offer for the investment of money, it can offer none whatever to the prospectors or workmen of California. Everything will be conducted there according to the Eastern standard; wages, methods of doing business and everything else will have to conform to the rates and usages that obtain in the older States. This, besides being distasteful to those who have long been on this coast, will place them to a great disadvantage, since they will not be able to readily accommodate themselves to these new requirements and conditions. That country, being so easily accessible from all parts of the Eastern States, with their large unemployed populations, will swarm with men in search of work, and who, being without means or other opening for earning a livelihood, will accept employment at anything and any wages that offer. The trip from Chicago to Deadwood, the principal town in the Hills, is made in four and a half days, at an expense of less than \$50; the time being much less, while the expense is not even half of what it costs to make the journey from San Francisco.

As for the placer diggings there, they are completely overrun, being, at best, of but limited extent, the same, in great measure, being also true of the quartz mines. When new discoveries have been made, such has been the rush to secure claims that only a few have succeeded in getting hold of anything; and now the country has been so thoroughly prospected, that there is but little chance of further important discoveries being made. We would therefore counsel such of our people as are desirous of engaging in mining or prospecting to stop nearer home, California offering, perhaps, as good a field for this purpose as can elsewhere be found.

The Transit of Mercury on May 6th and What it May Teach.

[Read before the California Academy of Sciences by PROF. GEORGE DAVIDSON, U. S. Coast Survey.]

You will have noticed some months since that the French Government had decided to send an astronomical party to California to observe the transit of Mercury on the 6th of May; and more recently inquiries have been made to me by the Superintendent of the U. S. Naval Observatory with regard to the proper locations for making the necessary observations. But preceding these announcements; and, in fact, over two years ago, I had proposed to the Superintendent of the Coast Survey to observe the transit upon this coast, which is so favorably situated for witnessing all the phenomenon. Unfortunately there are not funds available for the purpose, and the largest available telescope on the Pacific side of the continent is yet unmounted for the same reason. You will also recollect that in 1876 Le Verrier asked the co-operation of astronomers in making search for the problematical planet Vulcan; and a subsequent discussion of some of the supposed transits of this body led to a more positive conclusion of its existence, and a second call from Le Verrier and from Airy for renewed search, especially upon this coast; because should the phenomenon take place late in the afternoon in San Francisco it would of course be invisible to the observatories in the Atlantic or Western States.

From a profound discussion of the inner group of planets, Mercury, Venus, the Earth and Mars, Le Verrier reached the conclusion that the motion of the perihelion of Mercury is much greater than what is due to the action of the known planets. His comparison of the transits of Mercury observed before 1848, with the motion of the planet as determined from the theory of gravitation, had indicated that the perihelion of Mercury moves 40 seconds of arc more rapidly in a century than it should do from the gravitation of all the known planets of the system. He accounted for this motion by supposing that a small planet, or a group of small planets, revolved around the sun within the orbit of Mercury. The observations discussed by Le Verrier do not exhibit any motion of the node beyond that due to the action of the known planets; and, as a consequence, this necessitates the supposition of an intra-mercurial planet, or a group of planetoids nearly in the plane of the orbit of Mercury. Newcomb says that to produce the observed effect upon Mercury their total mass must be three or four times that of Mercury. Being very small individually, but of such great mass in the aggregate, their number must be counted by thousands or by millions; and, in fact, may only exist as a cloud-like mass. He suggests that in zodiacal light there exists such a diffused mass; and the question suggests itself whether the matter which reflects this light can be that which causes the before mentioned effect upon Mercury.

I have, in a former paper discussing the periodicity of the sun spots, been led to consider that the effect of all the planets upon the molten matter of the sun will be to deform the figure of that body in an almost infinitesimal degree and yet sufficient for the constantly changed form to react in an appreciable manner upon the nearest planets. If this is the case, we have here another source of disturbance of Mercury's motion.

The accurate observation of the present transit of Mercury is of especial importance, because it may afford data that will be decisive of Le Verrier's deduction of the yet unaccounted for motion of Mercury in perihelion.

The U. S. Naval Observatory has therefore issued a pamphlet of instructions to observers, and asks that every effort be made to have the phenomenon observed by all who have the requisite instrumental equipment.

The outfit is enumerated as follows:
1. A telescope of not less than three inches aperture, with a magnifying power of not less than 90 diameters. Observations with smaller telescopes or with lower powers will be of value mainly as to what character of results small instruments will yield.

2. A pocket or marine chronometer, or a good clock having a seconds pendulum.

3. A transit instrument or sextant for determining the error of the time-piece. If a sextant is used, the time should be determined by altitudes on both sides of the meridian.

In regard to the size of telescope recommended as the least from which good results can be obtained, I would remark that if a three-inch object glass will give good results at the elevation of San Francisco, a two-inch objective will give equally good results at the height of Summit station, on the Central Pacific railroad. In my experience at Verde, 5,500 feet elevation, I was able to see the companion of Polaris every night with faint illumination in the telescope of only one and seven-eighths inches objective. With a good three-inch objective, I can rarely see it at San Francisco.

In regard to the time-piece and the sextant with artificial horizon, I would remark that many of the finer American machine-made watches are sufficiently good time-pieces for the

determination of the epoch of the phenomenon, provided a series of good sextant observations are made in the morning before the observations and during the afternoon, and that in using the sextant for the determination of time, all its errors should be carefully examined and determined before hand and every item of work or experiment with this or any other instrument very fully recorded. It is very easy to record too little; too much cannot be entered in the note book. In using the artificial horizon, the observer will find that a capital protection to the quicksilver surface from the effects of the wind consists in spreading a frame of laces or mosquito-bar over the artificial horizon, without the usual glass roof. And with this protection a bucket of water will give a very good horizon.

It is necessary that this time should be correct within one or two seconds; a greater error would lead to misinterpretation of the observation or to an erroneous deduction. It is useless to attempt determining the contacts of Mercury with the sun's limb to the fraction of a second, even with higher powers, but the observer should endeavor to make an estimate of his probable error.

It is possible that arrangements can be made to communicate Washington clock time to observers through the Western Union telegraph lines, but such arrangement has not yet been completed. If I am in the city, I will be ready to transmit San Francisco time to any observer on this coast.

The computed time for the first contact of the limb of the planet with the disc of the sun is on the 6th of May, at 10h. 5m. 35s. A. M., mean time of San Francisco, and the contact will probably occur within a minute, or, at the most, within a minute and a half of this time. The observer must therefore determine beforehand, say for several days before the error of his time-piece, so as to know when to begin to watch for the contact. It is doubtful, however, if any one will see the epoch of actual first contact, but I believe that with a five (5) inch glass, high power and perfectly still atmosphere, the planet will be first detected outside the sun. In that case the observer will be able to determine precisely the time of the first contact. All the appearances of the sun's limb should be carefully noted, whether the border is steady and sharply defined or whether undulating, blurred, wavy, boiling, etc. These can be described by the observer and written out by the assistant or recorder before the observations actually commence; but the observer should not fatigue his eyes too much before he needs their use for the main object in view.

In a telescope, which sees objects in their natural position, the planet will make contact with the sun's border at a point about 95° from the vertex round by the left or 5° below the extreme left-hand edge of the sun. For a telescope that inverts, the contact will take place about 5° above the apparent right-hand edge. The edge of the sun can very readily be determined by placing a vertical spider-thread in the telescope tangent to the edge of the sun.

Should the observer fail to see the instant of first contact, he may note the time when the dark edge of the planet has just entered the disc and make a drawing to illustrate the conditions exhibited at the time of record. To an inexperienced observer, and even to relieve the experienced observer from counting seconds or half seconds for one or two minutes, I advise that an assistant, with watch in hand, note the time of contact or any other phenomenon upon the call of the observer, adding thereto promptly such explanations as are given.

Those who are earnestly interested in this matter should study the phase of contact painted upon a board and placed at a distance of not less than half a mile. The pamphlet of the Observatory furnishes diagrams for this object, and I hope to have copies to transmit to those intending to observe.

Internal Contacts.

Two or three minutes after the first contact the planet will advance its full diameter of 12 seconds of arc upon the sun's disc and thus afford the second contact, the time of which phenomenon can, under favorable circumstances, be determined with precision, and the observer should be prepared to note it with the utmost care, watching zealously all the attendant phenomena, especially the character of the definition of the limb of the sun and of the planet, because upon this will mainly depend the value of the observation. One of the most important means of ascertaining whether the contact is to be sharp, clear, well defined and steady, will be the sharpness of the bright cusps of the sun, formed after the planet is more than half its diameter on the sun. If they are sharp pointed, undisturbed, increasing in length and narrowness regularly, the conditions point to a favorable result and the trained observer can watch closely until these cusps meet. The instant of meeting is the epoch of the contact.

But if the atmosphere is unsteady—such as you see in an exaggerated case when looking over a wheat field on a hot summer's day—the cusps will appear ill defined, waving, suddenly prolonged and shortened, blurred. The unequally refracted waves of light will produce a confused image, which will lead the observer to doubt when the cusps actually meet; in other words, when the contact takes place. This confusion may mislead him five or more seconds. In the transit of Venus it has exhibited itself much less satisfactorily than this quantity in the English eye-observations. Let the observer bear in mind that so long as he can see a

black separation of the cusps, contact has certainly not taken place. Toward the instant of the cusps meeting, the space between them breaks up in a confusion of minute atmospheric waves that seem not solid black. The moment of true contact is, of course, that at which the first undulation of true sunlight is seen across the dark space as the cusps join. When sunlight appears undulating along the line of contact, the contact is past. If the observer hesitates and notes the phenomenon at this time, he should explicitly state all the circumstances and appearances.

The last contact of the planet with the sun will occur at 5 hours, 39 minutes and 15 seconds, P. M., San Francisco time, but the third contact, or second internal contact, will take place two or three minutes earlier, and both of these are important.

The third contact, or the second internal contact as it is designated, may be observed in the same general manner as the first, but taking care that the instant of the closing out of the sunlight is the epoch of contact. If the observation is delayed until the cusps are separated the contact is passed, and if the observation is made after the contact, all the appearances and a diagram should be added.

The fourth contact or second external contact is more difficult to observe than the internal

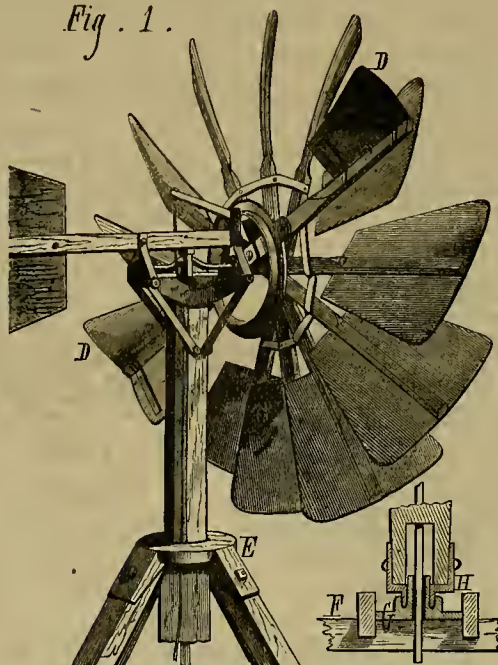
position of the planet; the other would require observations of the differences in altitude, at meridian transit, of the sun's upper or lower limb, and the upper or lower limb of the planet; the latter, in fact, both sets, would give measures of the planet's diameter.

Place of Observation.

There has been mentioned in all these observations the ill defined edges of the sun and planet, giving rise to what is known as the "black drop," "ligament," etc., apparently connecting the limbs of the two bodies; even in the published report of the Astronomer Royal of England, these apparent conditions are treated as cosmical phenomena, and have always been so treated, but you will recollect that several years since, and especially before the transit of Venus expeditions, I endeavored to prove, and in my own mind was perfectly satisfied, that the phenomena were wholly atmospheric. Now in the pamphlet of the U. S. Observatory and in Newcomb's Practical Astronomy these views are adopted.

This being the fact, I have suggested that the observations be made on the highest available points in this State, say, on the highest accessible peaks of the Sierra Nevada. If these are not accessible, on account of the snows, by the 1st of May, then I recommend the peak of San Bernardino, 12,000 feet elevation, and almost

Fig. 1.



SMITH'S PATENT WINDMILL—SAILS OPEN.

second or third contacts, and it is doubtful if any but a skilled observer will observe it with precision. If the limbs of the sun and of the planet are very unsteady, boiling, diffuse, or undulating, it will be next to impossible to note the instant when the last segment of the black body of the planet leaves the sun, because the

isolated, so that the atmospheric conditions would be, in my judgment, remarkably advantageous. Upon the means of reaching the summit, I have already had the pleasure of a personal conference with Mr. Wright, of San Bernardino, who has made the ascent. At this elevation, one-third of the atmosphere is below the observer, and the infinitesimal disturbances from irregularity of atmospheric refraction will be much lessened.

Barring this position, I suggest Summit station, on Central Pacific R. R., at an altitude of 7,200 feet; and as the next favorable for ease of ascent, there being a wagon road to the summit, wood, water, and a hotel near the summit, Mt. Diablo, 3,857 feet above the sea.

The observations at great elevations will, I am convinced, dispel the illusion of "black drop" being a cosmical phenomenon, whilst combined with the observation of the transit at low elevations, they will serve to determine how the ligament and black drop phenomena may be interpreted for the recent transit of Venus work. The arbitrary method adopted by the Astronomer Royal is not at all satisfactory to my mind, although the results lead to a parallax nearly equal to that derived from the other methods.

[Then followed technical description of the motion of perihelion, the long cycles of changes arising from the mutual attraction of the planets through the period of their revolution, etc.]

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: California, March 13th, \$118,372.94; Con. Virginia, 13th, \$195,519.18; Northern Belle, 11th, \$1,769.90; Christy, 14th, \$4,736; Tybo Con., 11th, \$9,432.82; Manhattan, 15th, \$16,239.74; Con. Virginia, 16th, \$96,898.84; California, 16th, \$215,297.26; Standard, 15th, \$16,387; Northern Belle, 13th, \$1,994.15; Tybo Con., 14th, \$4,943.09; Christy, 15th, \$3,538; Raymond & Ely, 12th, \$2,750.89; Grand Prize, 18th, \$13,400; Bechtel, 15th, \$15,316.67; Manhattan, 18th, \$16,697.19; Christy, 20th, \$3,086.

BETWEEN 5,000 and 6,000 Oldham weavers are engaged in the strike and lockout. Numbers of operators in other departments are kept idle in consequence of the stoppage of work by the weavers. Great distress prevails.

Smith's Improved Windmill.

This novel windmill, represented in the annexed engraving, is, from its capability for self adjustment according to the strength of the wind, excellently suited for raising water for cattle, supplying water to houses, driving churns, and other agricultural machinery, or to perform a number of the various duties for which a cheap and light motor may be required. The new features to which attention is directed, are the mode of connecting the arms bearing the sails, so that an excess of wind tends to fold up the latter; a brake wheel and an arrangement of a hollow revolving standard, which is held vertically, and is free to be acted upon by the slightest change in the direction of the wind. Figure 1 shows the wings expanded, and also a sectional view of a revolving standard. Figure 2 exhibits the wings closed. In the latter figure, the outer arm, A, alone is connected rigidly to the shaft, the other arms being free to revolve thereon. The sails, however, near their extremities, are connected by leather straps, which allow the wheel to spread out only to its full size. The shaft has a crank, and this communicates with the pump rod. On the rear of the rear arm, the brake wheel, B, is secured, in contact with which is the pivoted brake, C, governed by a rod leading down the standard which supports the mill. The tail board serves in this ordinary manner to cause the wheel to turn in whichever direction the wind may be blowing. When the wheel begins to revolve, and power is thus applied to the crank, the front arm, A, being rigidly fixed to the shaft, is retarded. The other arms, however, are free to spread out and complete the wheel—transmitting all their power through the straps to the front arm, A.

In order automatically to govern the speed in case of storms, the check wing, D, is applied to a sail of the rear arm. The wing is slightly held by a spring, and opens out when the wheel is in high motion, so far as to form a plane at right angles with the sail proper, thus retarding the movement sufficiently to fold the wheel, but not to stop the same. A weight on the end of the brake rod may be employed to hold the wheel when the latter is not required to revolve.

Referring to Figure 1, the vane is attached to a cross head on the standard, and suitable bearings are provided for the crank shaft to which the pitman is attached. This pitman passes down through the hollow of the standard to the pump rod. A frame composed of four angular legs is attached to the arms in the cap, E. Near the lower end of the legs is placed a cross piece, F, on which the lower end of the standard rests—see sectional view. In the center of this cross piece is attached a metal plate, G, provided with a tube in the center, through which the pitman passes. On the lower end of the standard is attached a plate, H, provided with up-turned flanges, and arranged to fit over the tube plate, G, and rest thereon. Any wind acting on the vane causes the standard to turn in the proper direction to keep the wheels always in the right position. The inventor of this mill is E. S. Smith, of Good Hope, McDonough county, Ill., where he may be addressed for further information. The wheel is easily made, and the castings are simple pieces, few in number.

Mining on the Deserts.

Lying on the northerly rim of the great Mohave desert are several mining districts of considerable merit, but which, although discovered and partially settled as much as 10 or 12 years since, have remained but little developed. This backward condition of things has been due to the fact that transportation to and from these mines is tedious and expensive, as they lie along way from railroads and navigable waters.

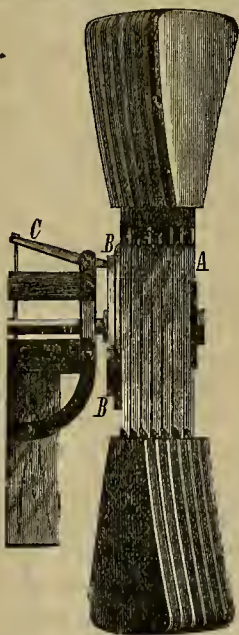
The principal districts in this remote and desolate region are Ivanpah and Resting Springs, both of which, after being for a long time under a cloud, are emerging from their obscurity, with some chance of making a fair return for the money invested on their account; at least such is the inference we draw from statements recently published in the *Coso News*. Resting Springs are distant from San Bernardino 210 miles, the road between these two points lying, for most of the way, across a sandy desert.

The new furnace of the principal company operating here has had its first run of 16 days, and closed down for the want of suitable ore, a portion of that from the Gunsight mine being found too dry for smelting without assorting. What course the company will now pursue is beyond conjecture, as they have made no preparation for more coal or a further supply of ore. The freezing up of the furnace has made this a dull camp, and one to which a poor man without means or in search of work should give a wide berth.

What the camp needs more than all else is a mill for the reduction of ores. There are several ledges already developed to a sufficient depth to justify the erection of a custom mill, as they give good evidence of permanence and richness.

Some of the ores resemble those of the Ivanpah district, and are quite as rich. Several experts have been in of late to examine the mines, all of whom have expressed a favorable opinion of them, and it is reported that the Los Angeles company are about to sell their furnaces and mines.

Fig. 2.



SMITH'S PATENT WINDMILL—CLOSED.

deformed edge of the sun is very slight indeed. In addition to these observations, I suggest to observers, who have a small transit placed in the meridian for the determination of the clock error, that the transits of the first and second limbs of the sun be observed on the meridian, and that the transit of the planet, as projected on the sun's disc, be also observed; the first and second limbs. This would give one of the two necessary co-ordinates for determining the exact

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When the inventor has fully decided to apply for patents in certain of these countries, we are always ready to give any further information that may be needed.

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The importance of obtaining patents in foreign countries, is obvious to all American inventors; but owing to the expense formerly attending these applications, and also to a lack of information on the part of inventors, as to the requirements in introducing and working their inventions, not as much use has been made of the patent privileges of these countries as might have been expected under other circumstances.

The patent laws of many countries, and notably Germany, have been very much improved of late years, and the rights of inventors are much better protected, now as the advantages which a country derives from inventions are better understood and appreciated.

The immense agricultural and manufacturing interests of many of these countries makes the introduction of improved machines and methods of greater importance, and renders the return to the enterprising patentee more certain and remunerative.

In France, Belgium, Austria, Germany, and some other European states, the patent becomes void upon the expiration or lapse of a patent of prior date, obtained in another country; and as in some of these states the specifications are published immediately after application, it is best to take out patents in all the countries in which it is desired to protect the invention, simultaneously.

In France and some other countries, medicines, articles of food, pharmaceutical compounds, and some other inventions are not patentable, although the processes may be; and in some countries warlike inventions are not patented, but are often appropriated by the government upon their own terms.

In England, France, Belgium and Spain, patents are usually granted if in their proper form, while in Germany, Austria, Russia, Sweden and Denmark, an examination is made, and all claims not considered novel are refused.

Germany especially, however, protects her patents, and punishes infringement as a criminal as well as a civil offense. In most of the countries, except England and the colonies, the patent must be worked in the country, and the working officially proved to the government within a certain time, or the patent will be forfeited; but, except in Austria, we can have the patent properly worked for a comparatively small sum of money. The Austrian law, however, requires the machinery to be manufactured in that country. In any case, however, if the patent be sold or disposed of, this difficulty is avoided by the inventor.

Australian Colonies.

See our special circular giving full information for these colonies.

Austria.

The term of an Austrian patent is limited to fifteen years, but the patent may be taken for a shorter period, and prolonged if desired. The invention must be worked in the empire within a year from the date of the patent, and becomes void upon the expiration of a patent of prior date obtained in any other country.

The cost of an Austrian patent, with all expenses paid for the first year, is \$100. A small yearly payment must be made to prevent the patent from becoming void.

Belgium.

Patents are obtainable in Belgium for twenty years, but if patented abroad, the patent will expire at the same time with the original patent. The patent must be worked within a year of the time of its being worked abroad. A government tax is payable each year, beginning with ten francs and increasing ten francs each year. The expense of obtaining a Belgian patent is \$90.

Brazil.

Imperial diplomas, possessing the legal force of patents, are granted for terms of from five to twenty years to inventors or importers of inventions. No tax is demanded by government, but the inventions must be worked within two years. The expense of a Brazilian patent is \$300.

Canada.

The patent law of Canada is modeled after,

and similar to that of the United States. Patents are granted in Canada for terms of five, ten or fifteen years, the shorter terms being extensible. A model is required for this province; also a petition and duplicate set of papers of special sizes. The invention must be worked in the province within two years after the date of the patent. The Canadian patent extends to all the provinces north of the United States, known as British America, and must be applied for within twelve months of the date of an American or foreign patent.

The cost of a Canadian patent, including express charges on model, etc., is \$65, and upwards.

Denmark.

The terms of a Danish patent varies from three to twenty years, being fixed by government. Patents of importation do not usually exceed five years. The invention should be worked within one year.

The expense of a Danish patent is \$100.

East Indies.

An East Indian patent is granted for a term of fourteen years, and must be for a new invention of public utility. The applicant must be the inventor, his executor, administrator, or assignee, and may be a resident, non-resident, British subject, or alien. The papers necessary are a petition, declaration, specifications and drawings, together with five copies, one for each of the Presidencies. The time of working the patent is not limited.

The cost of an East Indian patent is \$300.

France.

The term of a French patent is fifteen years, but is limited by the duration of a prior patent in a foreign country. The invention must be worked within two years of the date of the patent. A payment of 100 francs (\$20) must be made each year, or the patent becomes void. No model is required. The papers necessary are a petition, specification and drawings, in duplicate.

The cost of a French patent is \$100.

German Empire.

Under the law of June, 1877, patents may now be taken out for the entire German Empire. The duration of the patent is fifteen years. A valid German patent cannot be obtained if the specification has been published in any way before the German application is made. It should therefore be made before the issue of the American or English patent. The patent must be worked within three years of the grant. Models are only required in special cases, as in firearms. Specifications and drawings must be furnished in duplicate and of special sizes. An annual tax is payable, beginning with £3 the second year and increasing by £2 10s. each year. The expense of a German patent is \$100.

Great Britain.

A British patent includes England, Ireland, Scotland, Wales, the Isle of Man and the Channel Islands, but no colonies, as these have their own patent laws. The duration of a British patent is fourteen years; but in order to prevent it from expiring, a tax of £50 must be paid at the end of three years and £100 at the end of seven years. It is not imperative that the patent should be worked within a given time, but it is, of course, for the interest of the patentee to introduce his invention. A model may be deposited in the Patent Office museum, if desired, and will often assist in introducing the invention. The patent is granted to the one who first introduces it, and will not be sustained by the courts if it was publicly known in Great Britain before the date of the patent. No examination is made as to the novelty of any invention for which a patent is asked.

There are two methods of taking out a patent. The first is by filing a provisional specification, as it is called, and then filing a final or complete specification within six months afterwards. In the second, the complete specification is filed with the petition, and the patent is completed at once.

The disadvantages of filing a provisional specification are, the short time which elapses before the final specification must be filed, to prevent losing the patent; and the fact that whoever files the complete specification and obtains the great seal first, will hold the patent, even if another has a provisional specification on file, besides the chance of mistakes in completing the final specification. The patent may be taken out in the name of the foreign agent and afterwards assigned to the inventor, which is the usual practice, or the papers may be completed so as to be signed by the inventor himself, and the patent be taken out in his own name. The latter is our method. The documents necessary are a petition, declaration, specification, on parchment, and drawings in duplicate. No model is required, but the drawings should be very explicit. The expenses of a British patent is \$250.

Italy.

The patent may be taken out in this country from one to fifteen years. If taken out for a shorter period, the patent may be extended by the payment of a tax of about £1 16s. for each extension. Patents for less than five years should be worked within one year. Those over five years, within two years; but the time may be extended upon a proper showing. A tax of £3 is payable the second year, increasing by £1 every third year. The documents required are a petition, specification and drawings in triplicate.

The expense of an Italian patent for six years is \$200.

Norway.

A Norwegian patent is granted for from five to ten years, the duration being fixed by government. The invention should be worked within two years from the date of the patent. No annuities are demanded. The documents required are a petition, specification, and drawings in duplicate.

The cost of a Norwegian patent is \$175.

Portugal.

The terms of a Portuguese patent is fifteen years. A tax of £2 is payable annually. The government reserves the right to appropriate inventions of public utility, an indemnity being paid to the owner.

The cost of a Portuguese patent is \$300.

Russia.

Russian patents are granted for three, five and ten years; no extension of the terms for which it was originally issued being allowed. Inventions may be patented in the empire if not publicly worked previously, whether patented elsewhere or not. The patentee may be the inventor, his assignee, either a native or a foreigner. An examination made, as to novelty, correctness, etc., and patents are sometimes refused. The patent should be worked within one-fourth the time for which the patent is granted, and proof of the practical workings should be deposited with the Ministry within six months after such working. The importation of the patented article does not affect the validity of the patent.

The cost of a Russian patent for five years is \$300; for ten years, \$600.

Sweden.

The duration of a Swedish patent is usually ten years, and the invention must be worked within two years. There is an examination as to novelty. No model is necessary. The documents required are a petition, specification and drawings.

The expense of a Swedish patent is \$175.

Spain.

The duration of a Spanish patent is fifteen years, but the patent may be taken for five years and renewed. It must be worked within a year from the date of the patent. No strict examination is made; no model required. The documents necessary are a petition, specification and drawings.

The cost of a Spanish patent for five years is \$250.

Other Countries.

The following countries are of lesser value to patentees in general than those before mentioned; but in some cases patents may be advantageously taken for these countries also:

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Case of Good Hope.....	3 "	200	14 "
Chili.....	10 "	300	20 "
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Dominica.....	14 "	250	"
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Greece (application).....	14 "	200	"
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Uruguay.....	10 "	250	20 "
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J. A. Fay & Co.'s Woodworking Machinery, Bement & Sone's Machinists' Tools, Blake's Patent Steam Pumps, N. Y. Belting & Packing Co.'s Rubber Goods, Sturtevant Blowers and Exhaust Fans, Tanite Co.'s Emery Wheels and Machinery, Payne's Vertical Engines and Boilers, Judson's Standard Governors, Dreyfus' Self Oilers, Gould Manufacturing Co.'s Hand Pumps, Platt's Patent Fuse Lighters, Lovejoy's Planer Knives.

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Belting, Packing, Hose, and Other Mill and Mining Supplies on Hand.

Send for Illustrated Catalogue.

Copp's Hand-Book of Mining Laws.

Henry N. Copp's hand-book of mining laws, just issued, contains the United States mining laws and instructions thereunder, a digest of decisions, forms, list of mining patents issued, etc. The digest of decisions alone is a very valuable thing, giving, as it does, in brief form, all the decisions of the Secretary of the Interior and Commissioner of the General Land Office in relation to mining matters. These are all under proper headings for easy reference. Forms are given for notice of location, proof of labor, notice of forfeiture, miners' lien, application for survey, patent, etc., affidavit of improvements, etc. There is also a list of patents issued for mining claims from July 20th, 1860, to August 1st, 1877. The book is of pocket size and very convenient for all who are interested in mines. It will be sent post-paid for \$1, on application to Dewey & Co., 202 Sansome street, San Francisco.

W. ROSE & CO.,

Bureau for Mining Information,

GENERAL BUSINESS AGENCY, CONTRACTORS FOR MACHINERY AND MINING WORK.

S. W. Cor. PINE & SANSOME STREET, S. F.

REPORTS AND INFORMATION FURNISHED ON

MINING CLAIMS!

THEIR MERITS AND MANAGEMENT.

Working Capital Furnished for good Mining Claims, Assays, Surveys, Specifications and estimates of all kinds made.

Diamond Drill Co.

The undersigned, owners of LESCHOT'S PATENT for DIAMOND POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING AND TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

A. J. SEVERANCE & CO.

Office, No. 320 Sansome street, Room 10.

San Francisco Pioneer Screen Works,

J. W. QUICK, MANUFACTURER,

Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.
32 Fremont Street, San Francisco.

Steel Castings,

Solid and Homogeneous. An invaluable substitute for expensive forgings, or for Cast Iron requiring great strength. Send for circular and price-list to

CHESTER STEEL CASTINGS CO.,
EVELINA STREET, - - - PHILADELPHIA, PA.

DIVIDEND NOTICE.

Office of Consolidated Virginia Mining Company, San Francisco, March 7th, 1878.—At a meeting of the Board of Trustees of the above named Company, held this day, a dividend (No. 43) of two (2) dollars per share was declared payable on Thursday, 14th inst. Transfer books closed until 15th inst.
A. W. HAVENS, Sec'y.

To Ship and Engine Builders, Steamship Companies, Etc.

A Mechanical Engineer, having an extensive experience in Marine Engineering (especially compound) and Iron Ship Building, also in Steam Engines and Machinery in general, is open for engagement. First-class references. Address and references can be obtained at office of Scientific Press.

Metallurgy and Ores.

E. K. STEVENOT & CO.'S

BORAX AND METALLURGICAL REFINERY,

Assay Office and Chemical Laboratory,

Chestnut St., bet. Powell and Mason,

(NORTH BRANCH)

SAN FRANCISCO

Refiners of Borax, Alum, Nitrate of Soda, Saltpeter, Potash, Etc.
Sampling, Assaying or Analyzing of Minerals, small lots of ores bought or worked by any process.
Old Copper Plates bought or worked up. Deposits of Bullion run into bars.

E. K. STEVENOT,

Chemist and Mining Engineer. Office, No. 411 Montgomery Street, San Francisco.

Nevada Metallurgical Works,

No. 23 STEVENSON STREET,

Near First and Market Streets.

Ores worked by any process.
Ores sampled.
ASSAYING in all its branches.
Analysis of Ores, Minerals, Waters, etc.
WORKING TESTS MADE.
Plans furnished for the most suitable process for working Ores.
Special attention paid to Examinations of Mines; plans and reports furnished.

E. HUNN,

C. A. LUCKHARDT,

Mining Engineers and Metallurgists

JOHN TAYLOR & CO.,

Importers of and Dealers in

ASSAYERS' MATERIALS.

CHEMICAL APPARATUS AND CHEMICALS, DRUGGISTS' GLASSWARE AND SUNDRIES, Etc.

512 & 518 Washington St., San Francisco

We would call the special attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our stock of Clay Crucibles, Mullies, Dry Cups, etc., manufactured by the Patent Plumbago Crucible Co., of London, England, for which we have been made Sole Agents for the Pacific Coast. Circulars with prices will be sent upon application. Also, to our large and well adapted stock of

Assayers' Materials & Chemical Apparatus,

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast.
Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application.

JOHN TAYLOR & CO.

G. F. DEETKEN,

Metallurgist and Mining Engineer, U. S. Deputy Mineral Surveyor.

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Mines Surveyed, Examined and Reported on. Assays and Analyses carefully made. Furnaces constructed. Erection of Chlorination Works for Gold and Silver a specialty.

LEOPOLD KUH,

(Formerly of the U. S. Branch Mint, S. F.)

Assayer and Metallurgical Chemist,

No. 611 COMMERCIAL STREET,
(Between Montgomery and Kearny.)

SAN FRANCISCO, CAL.

INSTRUCTIONS IN ASSAYING,

Chemical Analysis, Determination of Minerals, and use of the Blow-pipe.

HENRY G. HANKS

Will receive a few pupils at his now laboratory, No. 61 Montgomery Street, up-stairs. TERMS MODERATE.

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STRONG & CO.,

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10 STEVENSON STREET, S. F.

GUIDO KUSTEL,

MINING ENGINEER and METALLURGIST.

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San Francisco Cordage Company.

Established 1856.

We have just added a large amount of new machinery of the latest and most improved kind, and are again prepared to fill orders for Rope of any special lengths and sizes. Constantly on hand a large stock of Manila Rope, all sizes; Tarred Manila Rope; Hay Rope; Whale Line, etc., etc.

TUBBS & CO.,

611 and 613 Front Street, San Francisco

MINING SHAREHOLDERS' DIRECTORY.

555 Solid Silver.....	9	El Dorado S.....	85c
555 Silver Hill.....	1.60@1	150 Falcon.....	40c@50c
580 Trojan.....	35	100 Grand Prize.....	.67
130 Utah.....	10@39	516 Gould & Curry.....	.63@77
920 Union Con.....	6c@64	220 Gila.....	.65c@60c
1000 Union Con.....	6c@64	1000 Gila.....	.65c@60c
100 Woodville.....	40c	510 Justice.....	.61@61
235 Yellow Jacket.....	81@85	310 Julia.....	.2
AFTERNOON SESSION.			
2205 Argentina.....	45c@50c	90 Jackson.....	.21
10 Alpha.....	.2	20 Leopard.....	.60c
10 Alpha.....	.2	81605 Modoc.....	.90c@85c
220 Best & Belcher.....	18c@18	710 Mexican.....	13c@12
435 Belmont.....	90c@90	255 Minatatau.....	10c@12
500 Belmont.....	90c@90	75000 Belle.....	.75c@75
150 Bullion.....	5c@51	1325 Navajo.....	21c@20c
50 Bechtel.....	.5c@5	50 New Corso.....	.40c
500 Belcher.....	3.40	990 Ophir.....	.33c@33
500 California.....	25c@22	50 Phenix.....	.1.10
375 DeFrees.....	.40c	70 Raymond & Ely.....	41c@40
150 Day.....	1.15@1.05	100 Star.....	1.20c@1.30
1000 Endowment.....	40c	25000 Star.....	Prize.....
100 Endowment.....	.65c	600 Savage.....	81c@8
500 Falcon.....	.60c	2150 Tiptop.....	2.70c@30
050 Grand Prize.....	51c@7	140 Union Con.....	.40c
500 Gould & Curry.....	71c@71	450 Young America.....	.5c
500 Hardside & Ely.....	70c@63	Wednesday A. M., Mar. 20.	
150 Hamburg.....	70c@63	705 Alpha.....	3.90c@4
145 Hale & Nor.....	73c@71	225 Alpha.....	.7c@34
250 Independent.....	80c@50	125 Best & Belcher.....	.3c@2
2400 Modoc.....	50c@.05	535 Belcher.....	3c@2
575 Mexican.....	13c@13	980 Bullion.....	47c@40
130 Minatatau.....	10c@101	1765 California.....	12c@26
500 Nevada.....	.50c@20	1000 Gila.....	.65c@60c
1805 Navajo.....	50c	610 Grand Point.....	41c@40
85 Overman.....	14c@14	310 Chollar.....	25c@24
098 Ophir.....	35c@37	1000 Imperial.....	40c@50c
200 Phenix.....	1.71	1770 Caledonia.....	1.70c@1.60
200 Rye Patch.....	1.52	1430 Gould & Curry.....	.6c@6
225 Silver Ship.....	35c	1480 Hale & Nor.....	7c@71
200 Star.....	1.80@1	675 Justice.....	.61c@61
300 Star.....	1.80@1	270 Kentucky.....	3c@2
210 Savage.....	.4	3775 Mexican.....	10c@10
435 Sierra Nevada.....	3.70c@3.90	9055 Ophir.....	24c@27
720 Tiptop.....	2.90@2.85	355 German.....	13c@12
500 Union Con.....	6c@51	3550 Saver.....	3c@2
200 Young America.....	.45c	1375 Sierra Nevada.....	2.90c@3.01
145 Yellow Jacket.....	81c@85	20 Sep Belcher.....	.20
Thursday A. M., Mar. 19.			
330 Alpha.....	9c@9	450 Utah.....	3c@31
330 Belcher.....	3.80@3.91	1820 Yellow Jacket.....	8c@71
535 Bullion.....	15c@14	AFTERNOON SESSION.	
20 Boyle.....	.50c	300 Alta.....	4.15c@4.10
10 Benton.....	10c	400 Argentina.....	.45c@45c
255 Con Imperial.....	.60c	300 Alta.....	.45c@45c
15 Chollar.....	.70c	300 Belle Isle.....	.60c@50c
200 California.....	25c@22	200 Belmont.....	.90c
15 Chollar.....	.70c	300 Belle Isle.....	.60c@50c
780 Con Virginia.....	20c@20	325 Day.....	1.05c@1.05
180 California.....	24c@24	150 Bechtel.....	1.3c@4
780 California.....	24c@24	150 Benton.....	.50c
400 Dayton.....	15c@16	300 Falcon.....	.61c@61
275 Eschequer.....	3.40c@3.45	340 Gould & Curry.....	.7c@74
790 Gould & Curry.....	71c@71	150 Gila.....	.60c
790 Gila & Nor.....	71c@71	250 Hrusa.....	.70c@65c
790 Gila & Nor.....	71c@71	500 Independent.....	.65c
470 Julia.....	2.40c@2.21	340 Justice.....	.61c@61
30 Kentucky.....	.34		
800 Leviathan.....	.35c		
800 Monumental.....	.35c		
210 North Con Vir.....	.50c@35		
200 New York.....	.80c		
200 Overman.....	35c@34		
505 Ophir.....	.35c@33		
625 Sierra Nevada.....	3.65c@3.35		

MINING SHAREHOLDERS' DIRECTORY.

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.									
Advance S M Co	Cal	1	50	Nov 21	Apr 15	May 9	B Lingley	309 California st	
Amazon Gm M Co	Nev	5	10	Feb 11	Mar 17	Apr 6	Jno Crockett	419 California st	
Bottle M Co	Cal	1	50	Feb 4	Mar 18	Apr 15	W H Lent	309 Montgomery st	
Dolomite M Co	Cal	1	50	Feb 4	Mar 18	Apr 15	J W Hester	418 California st	
Catacact & Wide West G M Co	Cal	1	15	Mar 5	Apr 8	Apr 29	J H Carey	402 Kearny st	
Excelsior S M Co	Nev		40	Mar 5	Apr 6	Apr 20	F P Devine	27 Market st	
El Tesoro M Co	Lower Cal	4	5	Jan 12	Mar 22	Apr 6	W H Chickering	214 Sansome st	
Enterprise Gm M Co	Cal	16	10	Jan 21	Mar 2	March 27	F J Hermann	612 Commercial bl	
Falcon M Co	Tuscarora	2	15	Mar 12	Apr 12	Apr 19	J W Brown	327 Pine st	
General Lee S M Co	Arizona	2	5	Mar 7	Apr 8	Apr 29	T E Atkinson	310 Pine st	
Golden Gate Gm M Co	Cal		1 00	Mar 2	Apr 5	Apr 25	J T McGohegan	Merchants Ex	
Glasgow G & S M Co	Nev	5	10	Feb 11	Mar 17	Apr 6	John Crockett	419 California st	
Gravel M Co	Cal	2	15	Feb 11	Mar 17	Apr 15	J Klennan	309 California st	
Little York S M Co	Cal	1	15	Feb 11	Mar 16	Apr 3	W H Morgan	219 Sansome st	
Loretta S M Co	Nev	1	25	Feb 21	Mar 29	Apr 13	J W Howden	318 Pine st	
Manzanita Gm M Co	Cal	1	25	Feb 19	Mar 25	Apr 15	T J Owens	216 Sansome st	
Moore's Flat Blue Gravel M Co	Cal	6	25	Mar 14	Apr 18	May 6	J M Buntington	329 California st	
North King M Co	Bolden M Co	Cal	1	50	Feb 4	Mar 18	Apr 15	J W Hester	309 Montgomery st
North California M Co	Washoe	2	25	Feb 3	Mar 9	March 30	A P Kluit	323 Montgomery st	
Northern King M Co	Arizona	2	123	Feb 7	Mar 20	Apr 10	J W Mugaen	318 Pine st	
New York M Co	Washoe	14	15	Feb 28	Apr 4	Apr 23	D L Thomas	419 California st	
North King M Co	Tuscarora	2	10	Feb 11	Mar 11	Apr 19	Althberg	438 California st	
Pittsburg G M Co	Cal	1	6	Feb 25	Mar 30	Apr 19	R Wegner	414 California st	
Real Del Monte M Co	Nev	1	30	Feb 28	Apr 4	Apr 23	A Baird	304 California st	
Red Cloud Gm M Co	Cal	1	30	Feb 28	Apr 18	May 16	J F Lightner	309 Montgomery st	
St Lawrence M & M Co	Cal	2	1 00	Mar 8	Apr 15	May 6	J M Buntington	309 California st	
St Lawrence M & M Co	Arizona	2	123	Feb 7	Mar 20	Apr 10	J W Mugaen	318 Pine st	
Southern Cross M Co	Washoe	1	7	Mar 5	Apr 18	May 6	CH Wakalee	535 Clay st	
Tuscarora M & M Co	Cal	1	15	Feb 23	Apr 2	Apr 27	F Osguen	309 Montgomery st	
Taylor M & M Co	Nev	5	5	Feb 19	Mar 27	Apr 17	S S Murfey	607 Montgomery st	
Tuscarora M Co	Nev	1	25	Mar 9	Apr 9	Apr 30	F R Stone	308 Pine st	
Wide Awake Prospecting & M Co	Arizona	3	2	Feb 16	Mar 19	Apr 16	E Queen	232utter st	
Welch Cn Q M Co	Cal	1	10	Feb 14	Mar 21	Apr 16	J P Forbes	420 Montgomery st	

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
American Flag M & M Co	Neu	G R Spilney	310 Pine st	Annual	March 25
Centras Con M Co	Neu	W W Parrish	328 Montgomery at	Annual	March 26
Champion M Co	Neu	C E Stevens	419 California at	Annual	March 27
General Allen M Co	Neu	C E Stevens	419 California at	Annual	March 27
Golden Star M Co	Cal	J F Hopkins	Stevenson's Bldg	Annual	March 28
Mint G & S M Co	Cal	J W Morgan	318 Pine at	Annual	April 2
Mint G & S M Co	Washoe	D A Jennings	404 California at	Annual	March 28
Washoe & Nevada G & S M Co	Washoe	W Duncanson	San Diego St Edg	Annual	March 28
Ward Con M Co	Neu	J Maguire	419 California at	Annual	March 28

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
California M Co	Washoe	C P Gordon	Nevada Block	2 00	Mar 1
California Virginia M Co	Washoe	A W Havens	Nevada Block	1 00	Mar 14
Empire G M Co	Cal	Chas Colbush	308 Montgomery at	1 00	Nov 5
Eureka G M Co	Cal	R Wegner	414 California at	2 00	Jan 23
Excelsior Water & M Co	Cal	G P Thurston	315 California at	50	Aug 15
Empire M Co	Cal	D A Jennings	401 California at	1 00	Feb 15
Eureka Con M Co	Nev	W W Taylor	309 Montgomery at	3 00	Feb 20
Grain Frize M Co	Nev	R H Brown	426 California at	1 00	Mar 12
La Grange Ditch & Hydraulic M Co	Cal	A Halsey	313 Montgomery at	25	Aug 15
Utah M Co	Utah	D Verdonal	409 Montgomery at	25	Oct 28
Northern Bello M Co	Nev	W Willis	303 Montgomery at	1 00	Nov 15
Rye Patch Con M Co	Nev	D F Verdonal	409 Montgomery at	25	Oct 22
Sierra Nevada M Co	Cal	W Willis	303 Montgomery at	1 00	Mar 12
Silver Kine M Co	Arizona	W H Booth	394 California at	50	Nov 20

tumble in Opau, utterly crushing many and carrying general consternation among those who

Mining Share Market.

California Board—Latest Sales

Wed'sday A. M. Mar. 20. 40 Crown Point.....

90 Alexander.....	52	500 Crevice.....	250	even with those who are best posted. Already
30 Almaden Q.....	2.05	100 Con Imperial.....	500	there is apparent a thinning out of dealers, and
140 Alta.....	403.90	180 E California.....	12	it would be little matter for surprise if sales at
110 Best & Belcher.....	154.0161	170 Exchequer.....	3	the hoards were to undergo an early and marked
20 Bullion.....	5	70 Faint & Curry.....	68.61	curtailment.
20 California.....	271	50 Hale & Nor.....	61	
35 Con Viridia.....	193.0220	35 Justice.....	61	

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

By Special Dispatch from Washington, D. C.

WEEK ENDING, FEBRUARY 26TH.

CAR TRUCK.—James G. Divoll, S. F.
SPOKE TENSIONING MACHINE.—Robert W. Eaton, Watsonville, Cal.
CORNICE MOLD AND MITERING DEVICE.—George K. Glenn and Henry Fern, Woodland, Purifying Coal.—Parker F. Morey, Oakland.
ANCHOR.—Robert R. Spedden and Daniel F. Stafford, Astoria, Oregon.
APPARATUS FOR ADMINISTERING MEDICINE TO HORSES.—Henry Hartman, Camp Halleck, Nevada.

WEEK ENDING, MARCH 5TH.

TOBACCO PIPE.—Thomas A. Van Norden, Quincy, Cal.
WATCHMAKERS' OIL CUP.—E. R. Weber, S. F.
STEAM ENGINE.—J. J. Carter, Sacramento.
OIL COOK STOVE LAMP.—H. L. Howse, Sacramento.
HANDLES FOR FRUIT BOXES, ETC.—R. E. Morey, S. F.

TRADE MARKS.

Plow.—H. C. Shaw, Plow Company, Stockton.
The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.
NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO. in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

NOONDAY M. Co.—March 7th. Capital stock, \$6,000,000. Directors—Wm. M. Stewart, Wm. B. Carr, Wm. F. Herrin, F. S. Bechtel and Frank Tagliabue.

DEMOCRAT CON. M. Co.—March 7th. Capital stock, \$9,000,000. Directors—Wilhelm Rose, C. H. Stillman, Oliver Teall, George W. Felissner and Charles A. Harris.

SITTING BULL M. Co.—March 8th. Capital stock, \$6,000,000. Directors—F. K. Bechtel, William Lent, William B. Carr, F. Tagliabue and William M. Stewart.

ETNA M. Co.—March 9th. Capital stock, \$10,000,000. Directors—D. Tomkinson, Archie F. McGrew, L. W. Holt, E. B. Jays and H. Searle.

ALTRA M. Co.—March 11th. Capital stock, \$10,000,000. Directors—Edward Barnes, M. G. Cobb, B. W. Mudge, B. F. Bernis and Daniel Buck.

TIOGA CON. M. Co.—March 13th. Capital stock, \$10,000,000. Directors—A. J. Ralston, John F. Boyd, Robert N. Graves, William M. Stewart and T. M. Quay.

THE rainfall the present season has been in inches at the several places mentioned as follows: San Francisco, 32; Grass Valley, 47; Ione City, 17; Jackson, 29; Weaverville, Trinity county, 54.

For the Paris Exposition.

The Committee on Minerals for the Paris Exposition announce that everything not in by the first of April will be left behind. It is likely that many mineral specimens intended for the great show will not reach here by that time, and as there are probably other things yet to be sent forward, it may be worth while to state that the American European Express, Baldwin Bros. & Co., Proprietors, 72 Broadway, New York, forward packages to the Paris Exposition at the following special rates: Four lbs., \$1.25; 8 lbs., \$1.50; 12 lbs., \$2.25; 20 lbs., \$3.25; 50 lbs., \$4.25; 75 lbs., \$5; 100 lbs., \$5.50; and for everything over three feet, 95 cents per foot. Custom expenses at Havre, 60 cents additional, per package. Freight in all cases to be prepaid.

WOODWARD'S GARDENS has the following new attractions: The buffalo chase; large whale skeleton; new museum; improvements in the zoological department, besides the other features which have made it popular.

Information Wanted.—Any information as to the whereabouts of Mr. John Donohue, who left Ireland for Idaho City, in April, 1876, will be thankfully received by a friend that is inquiring for him. Address P. O. Box 2361, San Francisco, Cal.

SETTLERS and others wishing good farming lands for sure crops, are referred to Mr. Edward Frisbie, of Anderson, Shasta County, Cal., who has some 16,000 acres for sale in the Upper Sacramento Valley. His advertisement appears from time to time in this paper.

MR. W. J. WOODLEY, who took out a Canadian Patent some four years ago, is requested to call at the MINING AND SCIENTIFIC PRESS PATENT AGENCY OFFICE. Business of importance.

ANY PHOTOGRAPHER having a large Camera Box for sale will please notify "N. S." at this office.

MONSIEUR MAKER and MACHINIST.—I. A. Heald, No. 514 Commercial St., San Francisco; (fourth floor).

GENERAL MERCHANDISE.

(WHOLESALE.)

WEDNESDAY M., March 20, 1878.

RAGS.—Jobbing.
Eng. Standard Weight, 10¢ @ 211
Neville & Co's.
Hand Sewed, 2x36, 10¢ @ 11
24x36..... 10¢ @ 11
24x40..... 10¢ @ 11
Machine Sewed, 2x36, 10¢ @ 11
Flour Sacks, halves, 8¢ @ 10
Quarters, 5¢ @ 5
Eighths, 4¢ @ 4
Hessian, 60 inch, 15¢ @ 15
45 inch, 10¢ @ 10
40 inch, 9¢ @ 9
Wool Sacks.
Hand Sewed, 3 1/2 lb., 47¢ @ 50
Machine Sewed, 4 1/2 lb., 47¢ @ 50
Standard Gunnies, 14¢ @ 15
Bean Bags, 6¢ @ 8

CANDLES.
Crystal Wax, 12¢ @ 12
Eagle, 12¢ @ 12
Patent Sperm, 30¢ @ 34

CANNED GOODS.
Assorted Pie Fruits, 2¢ @ 23
10 lb cans, 2¢ @ 23
Machine Sewed, 4 1/2 lb., 47¢ @ 50
Standard Gunnies, 14¢ @ 15
Bean Bags, 6¢ @ 8
Pickle, 1/2 gal., 35¢ @ 35
Sardines, 6 oz. box, 15¢ @ 15
Ht Boxes, 6¢ @ 8

COAL.—Jobbing.
Australian, ton, 7 00 @ 7 25
Coke Bay, 5 50 @ 7 00
Belmont Bay, 5 50 @ 7 00
Seattle, 5 50 @ 5 50
Cumberland, 14 00 @ 14 00
Mt Diablo, 4 75 @ 6 00
Lehigh, 22 00 @ 22 00
West Hartley, 7 50 @ 8 00
Scotch, 6 50 @ 8 00
Scranton, 13 00 @ 16 00
Venezia, 7 50 @ 8 00
Canal, sack, 75¢ @ 75
Choke, bbl., 80¢ @ 80

COFFEE.
Sandwich Id., lb., 21¢ @ 20
Costa Rica, 19¢ @ 19
Guatemala, 16¢ @ 16
Java, 24¢ @ 25
Manilla, 18¢ @ 19
Ground, in cs., 25¢ @ 25

FISH.
Sac'd Dry Cod, 5¢ @ 5
In cases, 8¢ @ 8
Eastern Cod, 9¢ @ 10
Salmon, hbls., 9 00 @ 10 00
Ht bbls., 5 00 @ 5 50
2 lb cans, 3 10 @ 3 20
Ht bbls., 11 00 @ 11 00
Ht bbls., 11 00 @ 11 00
Mackerel, No. 1, 11 00 @ 12 00
Ht bbls., 11 00 @ 12 00
In cases, 12 00 @ 13 00
Ex. Mackerel, 5 00 @ 5 50
Pick Herring, 3 00 @ 3 50
Boston Smoked Hg, 40¢ @ 50

LIME, ETC.
Line, Sea Cruz, bbl., 2 00 @ 2 25
Cement, Rosendale, 2 75 @ 3 50
Portland, 4 75 @ 5 50

METALS.
(WHOLESALE.)
WEDNESDAY M., March 20, 1878.

IRON.
American Pig, ton, 28 00 @ 30 00
Scotch Pig, ton, 28 00 @ 30 00
White Pig, ton, 28 00 @ 30 00
Oregon Pig, ton, 28 00 @ 30 00
Refrined Bar, 21¢ @ 34
Horse Shoes, keg, 5 00 @ 5 00
Nail Rod, 11¢ @ 11
Norway, Oval, 11¢ @ 11
CHIFFER.
Sheathing, lb., 34¢ @ 35
Sheathing, Yellow, 34¢ @ 35
Sheathing, Old Yellow, 12¢ @ 12
Composition Nails, 24¢ @ 24
Composition Bolts, 24¢ @ 24

STEEL.
English Cast, lb., 13¢ @ 14
Anderson & Woods, ordinary sizes, 15¢ @ 15
Drill, 15¢ @ 15
Flat Bar, 14¢ @ 19
Flaw Steel, 31¢ @ 121
Tin Plates.
10x14 T C Charcoal, 7 50 @ 8 50
Banca Tin, 23¢ @ 24
Australian, 17¢ @ 17

ZINC.
By the Case, 9¢ @ 9
Zinc Sheet 7x3 ft, 7 to 10, lb., 9¢ @ 10
7x3 ft, 11 to 14, 10¢ @ 10
8x4 ft, 8 to 10, 11¢ @ 11
8x4 ft, 11 to 10, 11¢ @ 11

NAILES.
Assorted sizes, 3 15 @ 3 25
QUICKSILVER.
By the lb., 43¢ @ 45

LEATHER.
(WHOLESALE.)
WEDNESDAY M., March 20, 1878.

Sole Leather, heavy, lb., 26¢ @ 29
Light, 22¢ @ 24
Jodot, 5 Kil, doz., 48 00 @ 50 00
11 to 13 Kil, 65 00 @ 76 00
14 to 19 Kil, 80 00 @ 90 00
19 to 24 Kil, 80 00 @ 90 00
Cornellian, 12 to 15 Kil, 57 00 @ 67 00
Females, 12 to 13 Kil, 63 00 @ 67 00
14 to 16 Kil, 71 00 @ 75 00
Simon Ulmo, Females, 12 to 13 Kil, 80 00 @ 90 00
14 to 15 Kil, 80 00 @ 90 00
16 to 17 Kil, 72 00 @ 74 00
Simon, 13 Kil, 61 00 @ 63 00
20 Kil, 55 00 @ 57 00
24 Kil, 55 00 @ 57 00
Robert Clark, 7 and 9 Kil, 35 00 @ 40 00
Kips, French, lb., 1 00 @ 1 35
Cal doz., 40 00 @ 60 00
For Sheep, all colors, 1 00 @ 1 25
Eastern Cal, Backs, lb., 1 00 @ 1 25
Sheep Roans for Topping, all colors, doz., 9 00 @ 13 00
For Linings, 5 50 @ 10 50
Cal, Russet Sheep Linings, 1 00 @ 4 50
Boot Legs, French Cal, pair, 4 00 @ 4 75
Good French Cal, 5 00 @ 5 25
Best Jodot Cal, 5 00 @ 5 25
Leather, Harness, lb., 35¢ @ 35
Horse, 35¢ @ 35
Siding, lb., 33¢ @ 37
Wet, doz., 30 00 @ 50 00
Buff, ft., 18¢ @ 20
Wax Side, 17¢ @ 18

GOLD, LEGAL TENDERS, EXCHANGE, ETC.
(Corrected Weekly by SUTRO & Co.)
SAN FRANCISCO, March 20, 3 P. M.
LEGAL TENDERS IN S. F., I. A. M., 99¢ @ 94 SILVER, 2 75 @ 3.
GOLD IN NEW YORK, 101 1/2.
GOLD BARS, 99¢ @ 94 SILVER BARS, 92 1/2 @ 93 cent. disc. count.
EXCHANGE ON NEW YORK, 1/2; on London bankers, 49 1/2 @ 49.
49 1/2 Commercial, 60; Paris, five francs @ dollar; Mexican dollars, 35.
LONDON Ounces 95 7/16; Bonds, 105 1/2.
QUICKSILVER IN S. F., by the flask, 3 lb, 46¢ @ 47 1/2.

LUMBER.

WEDNESDAY M., March 20, 1878.

CARGO PRICES OFFICET SOUND PINE. REDWOOD. RETAIL PRICE.

Rough, M., 13 00 @ 18 00
Refuse, 9 00 @ 10 00
Clear, 23 00 @ 23 00
Clear Refuse, 13 00 @ 24 00
Rustic, 13 00 @ 13 00
Refuse, 13 00 @ 13 00
Surfaced, 20 00 @ 20 00
Refuse, 14 00 @ 14 00
Refuse, 20 00 @ 20 00
Refuse, 12 00 @ 12 00
Beaded Flooring, 23 00 @ 23 00
Refuse, 13 00 @ 13 00
Half-inch Siding, 16 00 @ 16 00
Refuse, 14 00 @ 14 00
Half-inch Surfaced, 20 00 @ 20 00
Refuse, 14 00 @ 14 00
Half-inch Battens, 16 00 @ 16 00
Rough, 11 00 @ 11 00
Rough, Pointed, 18 00 @ 18 00
Shingles, 1 75 @ 1 75

Signal Service Meteorological Report.
Week Ending March 19, 1878.

HIGHEST AND LOWEST BAROMETER.
Mar. 13 Mar. 14 Mar. 15 Mar. 16 Mar. 17 Mar. 18 Mar. 19

30.02 30.12 30.15 30.03 29.77 30.04 30.13
29.08 30.06 30.12 29.89 29.60 29.81 30.05

MINIMUM AND MAXIMUM THERMOMETER.
01 64 66 66 62 65 66
64 67 54 50 52 63 60

MEAN DAILY HUMIDITY.
90 87 84 81 82 68 72

PREVAILING WIND.
SW SW SE SE SW SE SE

WIND—MILES TRAVELED.
196 100 107 89 127 147 168

STATE OF WEATHER.
Rainy. [C]lo'dy. [C]lo'dy. [Fair]. [C]lo'dy. [C]lo'dy

RAINFALL IN TWENTY-FOUR HOURS.
.73 .26 .1 .05 .01 .

Total rain during the season, from July 1, 1877, 32.29 in.

A \$1.00 Book for Every Reader.

THE ILLUSTRATED National Pronouncing Dictionary

—OF THE— ENGLISH LANGUAGE.

Orthography, and Pronunciation according to the best English authorities, with an appendix containing abbreviations, foreign words, phrases, and forms of address

TWO HUNDRED AND FIFTY ENGRAVINGS.

The design of an English Pronouncing Dictionary is to exhibit the pronunciation of the language as it is used in educated society. It must be admitted that of all the expedients which have been devised to serve this important end, the phonetic is by far the simplest and most effective. The orthoepical department of this dictionary is, therefore, phonetical. The usual orthography of every word is re-spelt in such a way as to show at once how it ought to be pronounced. By means of this mode of spelling, combined with proper accentuation and syllabification, a correct pronunciation is exhibited without confusing the eye or perplexing the memory, with a long array of orthoepical notation—an advantage of the utmost importance in any dictionary.

The generally accepted orthography of the language is maintained throughout the work, and the definitions are sufficiently numerous for all ordinary requirements. The illustrative engraving—an entirely new feature in a school dictionary—will greatly aid the pupil in understanding the given definitions.

On the whole, it is not too much to say, that this dictionary meets a great requirement of the age. By reason of the completeness of its component parts, the compactness of its form, and the lowness of its price, it is sure to command a very extensive circulation wherever the English language is spoken.

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UNITED STATES

Mineral Land Laws, Revised Statutes, AND INSTRUCTIONS AND FORMS UNDER THE SAME.

We have just issued a pamphlet containing the General Mineral Land Laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1896; Mining Statute of July 9th, 1870. Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Surveys; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Registers' Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Certificate of Fees; Proof of Ownership and Possession in Case of Loss or absence of Mining Records; Affidavit of Citizenship; Certificate that no Suit is Pending; Power of Attorney; Protest and Address Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, postage, for 50 cents. It should be in the hands of every one having any mining interests. DEWEY & CO., Publishers of the MINING AND SCIENTIFIC PRESS, S. F.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Cataract and Wide West Hydraulic Gravel

Mining Company.—Principal place of business, San Francisco, California. Location of works, Elio Mining District, Calaveras County, Cal.
Notice is hereby given, that at a meeting of the Board of Directors, held on the fifth day of March, 1878, an assessment (No. 1) of fifteen (15) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company in the rooms of Doctor Floto, 402 Kearney Street, San Francisco, Cal.
Any stock upon which this assessment shall remain unpaid on the eighth day of April, 1878, will be delinquent and made before, will be sold on Monday, the twenty-ninth day of April, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office, (in rooms of Doctor Floto,) 402 Kearney Street, San Francisco.

paid on the eighth day of April, 1878, will be delinquent and made before, will be sold on Monday, the twenty-ninth day of April, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

JOHN HOWARD CAREY, Sec'y.
Office, (in rooms of Doctor Floto,) 402 Kearney Street, San Francisco.

Excelsior Silver Mining Company.—Principal place of business, San Francisco, Cal. Location of works, Pototol District, Lincoln County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the fifth day of March, 1878, an assessment of forty cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the Company, 27 Market Street.

Any stock upon which this assessment shall remain unpaid on the sixth day of April, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the twentieth day of April, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

FRANCIS H. DEVINE, Sec'y.
Office, 27 Market Street, San Francisco, Cal.

Dolores Consolidated Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Wilson Mining District, Esmeraldas County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the twenty-fifth day of February, 1878, an assessment (No. 3) of three cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, 418 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the fifth day of April, 1878, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Thursday, the second day of May, A. D. 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, W. CLARK, Sec'y.

Office, Room 2, No. 418 California St., San Francisco, Cal.

Special Meeting—Gold Bar Gravel Mining Company.—A special meeting of the stockholders of the Gold Bar Gravel Mining Company will be held at the office of the Company, Room 29, Stevenson's Building, San Francisco, California, on Thursday, the twenty-eighth (28) day of March, 1878, at the hour of twelve (12) o'clock, noon of said day, to dispose of the delinquent stock of this company, bought in by the Secretary for the Company, at a delinquent sale of said stock, held on the eleventh day of March, 1878. T. F. HOPKINS, Sec'y.

Office, Room 29 Stevenson's Building, San Francisco, Cal.

Manzanita Consolidated Gravel Mining Company. Location of works, Nevada County, California. Location of principal place of business, San Francisco, California.

Notice is hereby given, that at a meeting of the Directors, held on the nineteenth day of February, 1878, an assessment (No. 1) of twenty-five cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the Company, Room 8, No. 215 Sansome Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the twenty-fifth day of March, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the fifteenth day of April, 1878, to pay said delinquent assessment, together with costs of advertising and expenses of sale.

THOS. J. OWENS, Sec'y.
Office, Room 8, No. 215 Sansome Street, San Francisco, Cal.

Taylor Mill and Mining Company.—Principal place of business, City and County of San Francisco, California. Location of works, Garden Valley Mining District.

Notice is hereby given that at a meeting of the Board of Directors, held on the nineteenth day of February, 1878, an assessment of five (5) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold and silver coin, to the Secretary, at the office of the company, 607 Montgomery Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the twenty-seventh day of March, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the seventh day of April, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

SAMUEL S. MURPHY, Sec'y.
Office, 607 Montgomery Street, San Francisco, Cal.

Annual Meeting—Union Stone Company.—The regular Annual Meeting of the stockholders of the Union Stone Company, of California, for an election of a Board of Directors (to act as Trustees,) to serve the Company for the ensuing year, and for such other business as may properly come before the meeting, will be held at the office of the Secretary of the Company, at 237 First Street, San Francisco, California, on Tuesday, April ninth, 1878, at eleven o'clock, A. M.

R. F. KNOX, Sec'y.
San Francisco, March 20th, 1878.

The Welch Consolidated Quicksilver Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Mount Diablo, Contra Costa County, Cal.

Notice is hereby given upon the following described stock, on account of assessment (No. 1) levied on the fourteenth day of February, 1878, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificates.	No. Shares.	Amount.
Corbett, A. C., trustee.....	5	100	\$ 10 00
Hearst, George, trustee.....	4	80	8 00
Forbes, A. P., trustee.....	2	1500	150 00
Forbes, A. P., trustee.....	28	000	00 00
Forbes, A. P., trustee.....	29	1500	150 00
Phillips, S., trustee.....	15	5000	500 00
Phillips, S., trustee.....	10	3000	300 00
Phillips, S., trustee.....	17	1000	100 00
Phillips, S., trustee.....	18	500	50 00
Phillips, S., trustee.....	10	100	10 00
Phillips, S., trustee.....	21	100	10 00
Phillips, S., trustee.....	24	100	10 00
Phillips, S., trustee.....	33	30000	3000 00
Phillips, S., trustee.....	34	10000	1000 00
Ryan, E. J., trustee.....	8	40000	4000 00
Ryan, E. J., trustee.....	12	500	50 00
Ryan, E. J., trustee.....	13	100	10 00
Ryan, E. J., trustee.....	23	100	10 00
Ryan, Mrs Sarah V., trustee.....	11	4100	410 00
Ryan, Mrs Sarah V., trustee.....	22	1000	100 00

And in accordance with law and an order of the Board of Directors, made on the fourteenth day of February, 1878, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, Room 7, No. 420 Montgomery Street, San Francisco, California, on Tuesday, the sixteenth day of April, 1878, at the hour of 12 o'clock M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. P. FORBES, Sec'y.
Office, Room 7, No. 420 Montgomery Street, San Francisco, Cal.

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Engines and Boilers

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Among the advantages gained by this holder are the following:

It can be opened and closed quickly.

The points are less obstructed while the articles to be filed are being placed.

The papers (wholly or partly folded) can be either "straddled" over the lower bar, or filed in regular book order.

The elastic hinge and band accommodate and hold firm either a large or small number of papers.

With less material, it is lighter and less cumbersome than other holders, and approaches nearer to bookbinding. It has no rigid hooks, hinges or loose parts to break or get lost.

It has proved durable in practice. The file is adjusted but 52 times a year for a weekly paper, and a sample holder can be opened and closed 1,000 times without showing wear.

Five sizes are made to suit the dimensions of different papers, viz.: 18, 22, 26, 30 and 34 inches, inside measure. Single samples will be mailed from office for 50 cents, (and upward, according to size), postpaid. Wholesale and retail agents wanted.

25 EXTRA MIXED CARDS, Snowflake, Oriental, Etc., with name 10 cts. J. B. HUSTED, Nassau, N. Y.

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It is not surpassed by any dining house in the city. The saloon is new, commodious, elegant and comfortable, and all visitors to San Francisco, who wish good food well prepared and properly presented, at reasonable prices, should try the "Palace." Being new, it is fitted up with the latest and best approved cooking apparatus and other conveniences for patrons.

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THE O'HARRA CHLORIDIZING FURNACE.

This furnace is guaranteed to chloridize from 88 per cent. to 95 per cent. of the silver, and put gold in a state so that 88 to 95 per cent. of the battery assay can be obtained by amalgamation on any gold or silver ore ever formed by nature.

The cost of Roasting and Chloridizing is as follows: One man, per day.....\$ 3 50 One man, per day.....\$ 3 00 Wood, 12 cords at \$3..... 7 00

Cost of 20 tons.....\$13 50 Cost of one ton..... 67 1/2 From 24 to 5 per cent. of salt is necessary. In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

Several furnaces are in successful operation in California, Nevada and Idaho.

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FAVORABLE LOCATION,
GUARANTEEING
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Choice Grain, Orchard and Pasture Land,
Is now offered for sale at low prices and on favorable terms of payment,

In Sub-Divisions to Suit Purchasers.

The ranch was selected at an early day by Major P. B. Redding, one of the largest pioneer land owners in California. It is situated on the west side of the Sacramento River and extends over 20 miles along its bank.

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Figs, Grapes, Peaches, Prunes, Almonds, English Walnuts, Oranges and other temperate and semi-tropical fruits can be raised with success on most of the tract. Also, Vegetables, Corn and all other cereals ordinarily grown in the State.

A considerable amount of the rich bottom land has already been cultivated.

Deep Soil With Lasting Qualities.

The soil throughout the tilled portions of the ranch proves to be of great depth and enduring in its good qualities. It is quite free from foul growths. The virgin soil among the large oak trees on the bottom land is easily broken up and cultivated.

The California and Oregon railroad traverses nearly the entire length of the tract. There are several sections, stations and switches, besides depots at the towns of Anderson and Reading—all of which are located within the limits of the ranch.

For Colonies.

Land suitable for settlers in colonies can be obtained on good terms.

Town Lots

Are offered for sale in Reading, situated on the Sacramento River, at the present terminus of the railroad. It is the converging and distributing point for large, prosperous mining and agricultural districts in Northern California and Southern Oregon. Also, lots in the town of Anderson, situated more centrally on the ranch. Lots in both these towns are offered at a bargain, for the purpose of building up the towns and facilitating settlement of the ranch.

Purchasers are invited to come and see the lands before buying here or elsewhere. Apply on the ranch, to the proprietor,

EDWARD FRISBIE,
Anderson, Shasta Co., Cal.

FRANCIS SMITH & CO.,
MANUFACTURERS OF
THE PATENT CHANNEL IRON WHEELBARROWS,



The Strongest Barrow Made. These Barrows are made by Superior Workmen, and of the best material. All sizes kept constantly on hand.

Lap-Welded Pipe, all Sizes, from Three to Six Inches. Artesian Well Pipe. Also, Galvanized Iron Boilers, from Twenty-five to One Hundred Gallons.

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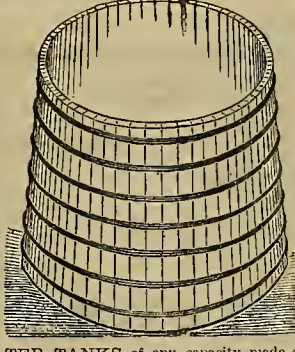
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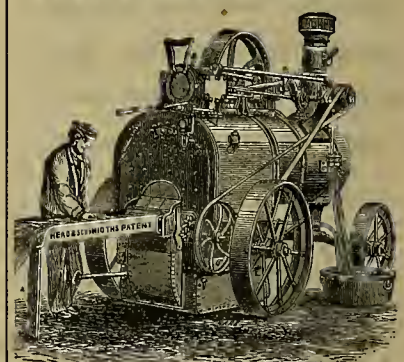
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MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, MARCH 30, 1878.

VOLUME XXXVI.
Number 13.

A New Rotary Stamp Mill.

Dock E. W. Taylor, of San Bernardino, has applied for a patent through the MINING AND SCIENTIFIC PRESS Patent Agency for a rotary stamp mill, which is made on an entirely new principle. Although rotary in its motion, the ore is crushed by stamps, having cams and tappets to operate them, and there is no grinding action about it. Knowing this machine to be one which will interest the mining community, we have prepared an engraving of it, which accompanies this description. The series of stamps are peculiarly constructed, and fitted so as to project radially from the perimeter of a drum or wheel, which is mounted upon an axis so as to be rotated by any power. Below the drum is placed the mortar into which the stamps are allowed to drop. The stamp stems are provided at their inner ends with tappets, which move upon and are supported by a curved cam adjustably fixed to the frame, so that the stamps will be held up until the point is reached where they are required to drop. After the blow has been given, the tappets are received upon a cam-shaped, curved incline, and as the drum revolves this incline brings the stamps gradually towards the center again, so that when they have reached the top the tappet is ready to be transferred to the other incline without jar or noise.

In the engraving, *A* is the mortar of the battery, which is set upon a solid foundation, independent of the frame, *B*, which supports the drum, *C*. This drum has a shaft turning in boxes upon this frame, and by means of a pulley, *D*, motion may be imparted to it from any source of power.

As shown, the drum consists of a web extending outward from the hub, *E*, and having an outward rim, *F*, projecting upon each side of the web, so as to allow the stamp-heads to pass through it, one set on each side of the web. Between this hub and this rim are the projecting flanges, *F*, which serve to hold the boxes, *G*, through which the stamp-stems pass and by which they are guided. These boxes are preferably made of wood, as is usual for such guides in straight batteries, and they consist of an outer and inner part, secured together by means of screw bolts. These bolts perform a double office by having a thread which turns in the inner portion of the box; the point of the screw, by pressing against the web, will force the box outward and thus adjust it at any time to accommodate the wear, while a nut turning upon the outer part of the bolt itself holds the cap or outer part of the box to its place. The head of this bolt is fitted to receive a wrench, by which it can be turned at any time to adjust the boxes.

The stamp heads are formed in one piece with the stem and are made of wrought iron, so that the shoes can be made with a larger shank without hurting the heads. The stems are made of a larger size, close to the head, to strengthen them also, and the enlargement may extend through the boxes, *G*, as shown. The tappets form heads which fit upon a taper made in the inner end of the stem, so as to admit an inclined key by which they may be driven off from the stem when desired, and these tappets may be reversed when desired if too much worn upon one side.

The outer guides for the stamps consist of an enclosing strap or plate having steel screws which pass through it so as to stand radially to the axis of the head. These screws are set up so as to take the bearing of the head on all sides, and thus guide it without allowing it to touch the rim or flange, *C*, and act in lieu of a bearing. These inner and outer guides, with the short stems used, insure great steadiness of motion to the stamps, under high rates of speed.

The mechanism for operating the stamps consists of two curved cams or inclines, which are secured so as to be vertically adjustable. These curved cams may be secured to plates which move in guides, so that the plate and cams may be elevated or lowered, thus enabling the cams being adjusted to any wear of stamps.

The cam forms an arc of a circle and receives the tappet when the stamp has, by the rotation of the drum, reached a horizontal position, and it thus sustains the stamp by supporting the

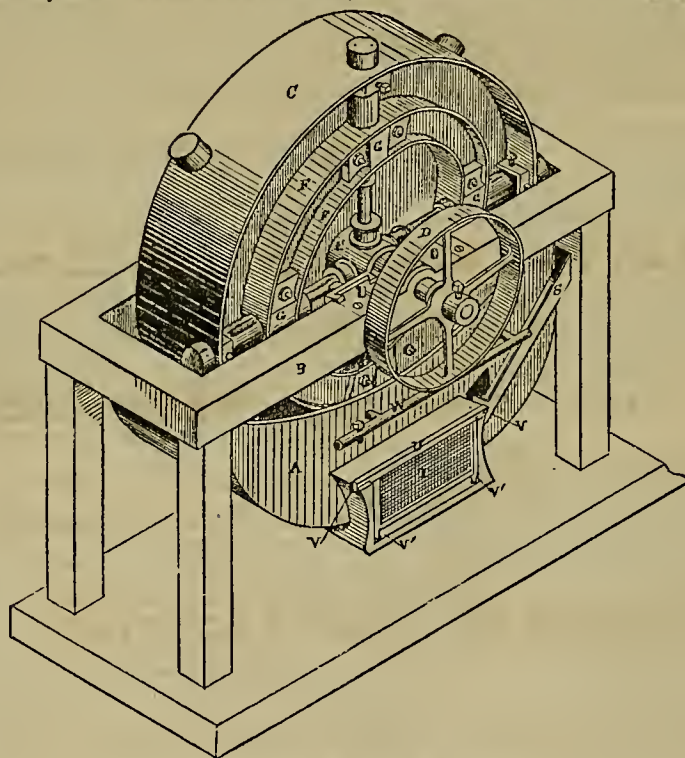
tappet until it has reached a point where the tappet leaves the cam and the stamp is allowed to fall upon the dies in the bottom of this mortar. The length of the cam may be easily made adjustable, so that the point at which the stamp drops shall be sooner or later, as may be desired.

The tappet drops off of this cam, so that the stamp strikes its blow in the mortar and then another cam takes it up. This cam is in the form of a spiral, its outer end being sufficiently far from the center to pass under the tappet after the stamp has fallen. By the rotation of the drum, and as its inner end approaches the hub, it gradually draws the stamp inwards until at the point where the stamp-stem lies horizontal, or about that point, the tappet has been drawn into the hub and is again ready to be transferred to the other cam. By this construction, the tappet moves noiselessly, making no jar or pounding as they are raised and transferred from one flange to another.

The feeding device consists of two troughs, *S*, one upon each side of the mortar, and these troughs may unite at one end in a sort of double

This whole mechanism is easily and cheaply constructed, and, as any miner can see, is made portable, so that a crushing mill may be set up in any comparatively inaccessible place. By making the stamps of a smaller diameter, it causes them to penetrate the material within the mortar and more thoroughly pulverize it. By the construction employed, the blows of the stamps can be delivered with much greater rapidity than on any battery using straight lifts and cams and each blow will be just as effective.

The principal object of Mr. Taylor in getting up this mill is to give to the mining public a cheap mill and one by which he could get up motion in stamps. It can be run by steam, water or horse power, and will occupy less space, require smaller buildings, and a series of mills can be attached to the same shaft so as to have as many stamps running as desirable. He claims that he can run these mills with one-half the power required for a straight battery, owing to the fact that the stamp coming up is supported on the incline or cam near the center of the wheel or drum, and the one going down



TAYLOR'S NEW ROTARY STAMP MILL

hopper, so that the material may be fed to either side without any difficulty or extra labor. Mr. Taylor secures the screens in place by novel means. A frame, *U*, has projecting lugs at the angles, as shown at *V*, *V'*. Sockets are made at the bottom of the screen, opening to receive the posts, *V*, and slots at the top of the same, to receive the lugs, *V'*. These lugs and the posts are made inclined at their outer faces, and the slots or openings, into which they are received, are also inclined, so that when pressed into place the frame binds the screen closely against the edge of the screen-opening and thus holds them so firmly that there will be no need of any binding or rim of any kind around the edge of the screen. The effect of the jar or concussion of the stamps will be to force the inclined holding-lugs more firmly into their sockets and prevent any possibility of the screens becoming loosened.

A pipe, *W*, carries water along the side of the mortar, and suitable passages and cocks allow it to be introduced into the inner side of the periphery of the drum or wheel. This washes any pulp or dirt off and keeps the stamp-heads and the openings, through which they pass, from becoming clogged. The drum is inclosed by a covering, which will fit close and prevent the wheel from throwing any pulp out.

has its weight as a counterbalance, on the periphery of the wheel. The momentum of the wheel also assists this lift, and enables him to strike a heavier blow with 600 pounds of iron than can be struck with 700 pounds on a straight battery. The discharge is large, being on both sides, consequently he proposes to do more work with eight stamps than a straight battery can with ten.

An ordinary sized mill with eight stamps, of this style, will be sold a great deal cheaper than the old style mills. An eight-stamp mill could be increased to 16 if desired at any time by the simple introduction of the stamps, no other mortar, cams or anything else being required. A full-sized mill will have a wheel about eight feet in diameter, and the stamps will weigh about 600 pounds each. A very rapid motion can be got up on this mill, and it can be run up to 150 drops per minute to each stamp, a medium speed being about 100 drops.

Mr. Taylor is an old quartz miner and was one of the stockholders in the Tennessee mining company, on the Cosumnes river, in El Dorado county, where the first quartz mill in this State was erected. This was in 1851. He has been connected with the mining interests ever since, and this mill now perfected is the result of his efforts to get up something which

would do its work to the satisfaction of the mining public, and do it cheaply. Knowing that stamps did the best work, he has devised this method of operating them so that more frequent blows could be struck and less power be required. In cleaning up the battery there is no need of "hanging up" the stamps, as by moving the wheel to one particular point the stamps will rest on the cams and no stamp will be on the mortar. This inventor can be addressed care of this office by those desiring further information.

Better off Than Others.

While business on this coast is dull, and many are unable to get employment, our industrial condition is better, no doubt, than that which prevails just now in most other countries. With us none have died from hunger, nor, in California at least, have many suffered from exposure to the inclemencies of the weather; there being here, too, a good prospect that all will obtain relief through an early return of our usual prosperity. Very different is the state of affairs in most other lands. In certain portions of China the inhabitants are perishing by millions from starvation. In the war-infested districts of Europe great numbers are dying from the same cause, and even in England vast populations of factory operatives are without employment and, as a consequence, pinched for food. The English cotton and iron manufacturers, owing to the depressed state of trade, have been forced to curtail operations and greatly reduce the wages of their employees, a measure that has already thrown many out of work, and must soon have the effect to still further diminish the number of the employed. A notice of reduction of wages in the Lancashire district, threatens to procure a strike and lock-out between masters and workmen, which, should it occur, will affect 250,000 cotton spinners. By the stoppage of two large iron works in Yorkshires, over 1,000 men have been thrown out of work, and should the colliers strike, as it is feared, there will be 30,000 more forced into idleness. The reduction of wages insisted upon ranges from 7% to 10%, the latter having already been accepted in some instances by the miners.

It is in this country, a fortunate thing for both employers and workmen, that our leading industries are for the most part such as not to render recourse to this arbitrary class of measures necessary. In the production of articles for export our natural advantages are such that we can successfully compete for markets abroad without reducing wages to the point of starvation; and when business has once recovered from its present depression, we look for a somewhat prolonged season of prosperity among all classes on this coast.

QUESTIONS ABOUT TELLURIUM.—In answer to inquiries as to the price, uses, etc., of the metal, tellurium, we may say, there is no market for it, at least on this coast, at any price; nor, is it of any special importance in the economic arts. This metal is of a silver-white color, and chemically partakes of the properties of selenium and sulphur. It occurs at several places in California, combined with various other metals. In the mines at Rawhide Ranch and Carson Hill, on the great mother lode, it is found as a telluride of gold and silver, some of the ores being exceedingly rich in the precious metals, more especially gold. Along the extensive ferruginous belt that traverses the westerly portion of Placer county, and at a point about 40 miles from Sacramento city, some of the iron ore carries a notable percentage of tellurium, assays denoting the presence of from two to three per cent of this metal. We cannot learn, however, that any efforts have been made to utilize the tellurium found here or elsewhere in the State.

The Salt Lake Tribune, believes that Utah will yield \$10,000,000 in silver this year, and intimates that if a new mint is to be established, Salt Lake City would be a good place.

The establishment of smelting works is being publicly discussed at Stockton.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Mining Around Smartsville, Yuba County.

The road from Marysville to the foothills up the Yuba was found much better, in view of the past stormy weather, than could have been anticipated. The traveling public is greatly indebted to the Excelsior water and mining company, of Smartsville, with some assistance from one or more of the large companies of Nevada county, and a few farmers of Yuba, for building several miles of levee along the Yuba river, thereby providing a good highway for travel and at the same time protecting for the present a large scope of fine agricultural land from destruction by the tailings. This

Mining Debris Question

Is the all-absorbing topic among the farmers, whose immediate interests are more directly at stake, and is not without consideration on the part of many thoughtful and reasonable miners, who are ready to admit that it is a question that has more than one side to it. The respective rights of the miner and farmer must, of course, be left to the courts to be settled.

The most feasible plan suggested for the prevention of this evil, is to utilize the tailings as far as possible in the mountains and foothills, by damming the streams and turning them aside, thereby converting into valuable land what is now only a barren waste; and next by the construction of high and substantial levees along the banks of the rivers where they congregate through the valleys. Now comes the

Most Difficult Question:

Who is to build the levees, the farmer, the miner, or the State? The mining and agricultural are at present the two great interests of the State. It would be very burdensome for the farmer to pay the whole cost of leveeing, and not much less so for the miner, even if it could be determined (by no means an easy problem) what proportion each should pay. The people of the State cannot spare the millions annually disbursed by the mines, nor can the miners afford to lose the many millions invested in mining property. On the other hand the people cannot afford to listlessly look on and see so many millions of taxable property in the shape of fertile lands, ruined for present productivity, and say it is no interest or business of ours. Let the farmer, miner, merchant, mechanic and all, take a broad view of the subject, cordially co-operate in hearing the burden of digging necessary canals and leveeing the rivers liable to overflow, and they will be likely to find it, in the long run, far the wisest policy.

Smartsville

Is one of the neatest of mountain villages, beautifully situated on the bluffs of the Yuba, 18 miles from Marysville, its population, inclusive of Timbuctoo and other small places in the vicinity, being estimated at about 1,500. There is here a Masonic hall and two fine churches, a good graded school, whereat 255 scholars are taught after the most approved methods, and the town is also supplied with hotel accommodations of an excellent kind. The camp has been and is now one of the richest in the State, having produced from her gravel deposits in the neighborhood not less than \$13,000,000 in gold.

The Blue Point Mining Company,

P. Campbell, Superintendent, owns some very valuable ground here, said to have yielded at one run of 43 days, two years ago, as much as \$75,000. They are at present washing what is believed to be fine gravel. The southerly face of the bank is 85 feet high, and the easterly 120 feet. Some large blasts have been set off here recently, in which the powder of the California powder company has done fine execution. In one instance 1,091 kegs of powder were exploded at a blast, shattering and throwing down an immense quantity of earth. They have a tunnel three-quarters of a mile long, discharging into the Yuba, and a ditch 28 miles in length. About 90 men are constantly employed about the mine and ditch. In order to establish communication between the mine and two reservoirs, situate the one five and the other 15 miles distant, the company, not to be behind the times, have ordered a telephone. In the absence of the Superintendent, Mr. W. Barker, the foreman, seemed to have full charge and to be equal to the task, as all things moved like clock-work.

The various mining and ditch properties that formerly existed in this vicinity, causing sometimes conflicts of interest, have all been consolidated into one incorporation, called

The Excelsior Water Mining Company,

Who now own 1,500 acres of mining ground and 2,500 acres of agricultural and grazing land. They are said also to have ditches that aggregate in length some 220 miles, with a capacity of 6,000 running inches. They have five hed-rock tunnels in addition to one just completed, 3,280 feet in length, and which opens up 320 acres of virgin ground, from which the company expect to take out, the present year, at least half a million dollars. Mr. D. McGanney is the Superintendent of the company.

To Mr. James O'Brien, his assistant, I am indebted for the foregoing suggestions touching the debris question, besides much other information herein contained.

A quartz ledge has been discovered and is

now being worked at Timbuctoo, a mile below Smartsville, known as

The Mark Anthony,

S. O. Gunning, Superintendent. It is opened by a shaft, 180 feet, and by a tunnel 350 feet in length, reaching a depth of 100 feet. The lode shows an average width of five feet, and the quartz, by tests, a working value from \$8 to \$10 per ton. A good substantial 10-stamp mill has been erected at this mine, which is now running. It is driven by water power, the large over-shot wheel, 40 feet in diameter, having capacity to carry 30 stamps. Both were put up by Mr. Dockstader, of Sacramento, and fully sustain the reputation of the builder. The company have not yet had a clean-up, but are sanguine as to the results. A. C. K.

The Two-Headed Snake.

In our issue of February 16th, we gave a full and accurate description by Mr. Wright of the very remarkable young snake with two perfect heads, which was on exhibition in this city in December last, and which we had photographed and engraved by our artists. The writer's inquiry after other instances of the kind has brought us the following letter.

EDITORS PRESS.—I notice in the PRESS of the 16th inst. an elaborate account of a two-headed snake found in Santa Clara county. The writer asks, "can any one tell us of another instance of such a double-headed reptile as California has now certainly produced in this snake?" I answer affirmatively, that Missouri has produced a *Liasus nativus*, which is a *fac simile* of the one you speak of except that it was a different kind of snake. It belonged to the rattlesnake family and was not so large as the California snake—being about one foot long. It was captured by Capt. Charles McNeal, of Greenwood, Jackson county, Mo., in October, 1872 (if I mistake not), when plowing. The plow having unearthed a nest of young rattlesnakes, the Captain was reminded of the scriptural injunction that "the seed of the woman should bruise the serpent's head," and he at once proceeded to bruise. Having struck one a blow, he was about to repeat it when he discovered that the reptile had two separate and distinct heads. He at once captured it. The wound it had received proved fatal and it died in two or three days afterward. It was then placed in alcohol, and is now, I think, the property of Arthur McNeal, of Greenwood, Mo.

N. LEVERING.

Los Angeles, Cal., Feb. 29th, 1878.

We also have a note from Mr. A. Zeelandlaar, of this city, informing us that he has seen such curiosities at Batavia, in Java, and a friend of his substantiates the statement.

We have lately learned, that our California specimen, after being kept on exhibition at Woodward's gardens for two days, was taken back to its owner in Santa Clara county; that it lived about six weeks after its capture, and is now preserved in alcohol.

Muscle Versus Style.

Mining matters in the old camps have assumed a healthy appearance lately, which can be accounted for only by reason of practical men getting hold of the mines. Mines that failed to feed managers, whose principal business was to draw salaries and smoke cigars; good properties that failed to support a fashionable office in Salt Lake city, with a secretary and two assistants who parted their hair in the middle, spelled their middle names in full and wore white vests; mines that tottered beneath a load of impecunious officers from the candle hoss up to the man who signed the checks and drove a fast team, are paying now handsomely.

This is as it should be. Practical miners have taken leases and contracts in the old mines and are doing well, every man of them. At Ophir, Dry canyon, Bingham and the Cottonwoods we know properties that had bankrupted the owners, now yielding good ore and lots of it.

The men who take leases on mines are miners by profession; it is their study night and day. Their working hours are not regulated nor their manner of work prescribed by any rules laid down by an imported manager. They know the ground in which their hopes are centered, and if they cannot squeeze a living, if not a small fortune, out of the mine it may be taken for granted that the property is of no account to any one.

Let the miners work the mines. Crowd into your tunnels and shafts the energy expended in fashionable turnouts and hiliards by your stiff-collared managers, and we'll venture to say that the dividends will not be all Irish.—*Salt Lake Tribune.*

THE PALISADE COAL MINE.—The Eureka Sentinel, Nevada, reports an important development in the Palisade coal mine, which has caused quite an excitement among the stockholders and an advance in shares. A seam of coal, three feet thick, has been cut in the tunnel which is being run to intersect the vein. This seam differs from what has hitherto been found in the mine in this, that it burns to a clear, white ash, while the shale found near the surface, though blazing fiercely when lighted, was as bulky after, as before combustion.

Ore Smelting at Black Hawk.

Concerning operations at this place, a correspondent of the *Courier-Journal* (Col.) writes as follows: The Boston and Colorado smelting works, probably the best paying stock in the world, are situated in the gulch, right under the towering mountains, and, with their acres of buildings and yards, their tall chimneys sending up black smoke and sulphur fumes, their side-tracks from the railroad covered with trains of ore from every section of the State, their hundreds of husy men, all tell loudly of the industry that is carried on within. At the business office we were received by Mr. Henry R. Wolcott, the Superintendent, and obtained his written order to be conducted through the establishment. We pass through an immense shed filled with heaps of ores of every grade, color and value, awaiting their turn to be roasted. Here is a heap of tellurium ore from Boulder county, third class, worth about \$1,200 per ton, and here is another from the same lode for which was paid \$20,000 per ton. We will not price the other heaps; they are too insignificant. Besides we must see how these fabulous sums of money are extracted from the rock and dirt that looks so valueless. We will take each process in regular order. Those heaps of dirt there from which you see the sulphurous smoke rising, consist of ores containing sulphur, zinc and lead, which must go through this roasting process for three months in order to prepare them for a second process—a passage through the Blake crusher and Cornish roller, which ponderous machines reduce them to small particles. These are then thrown into large furnaces—about four tons to a charge—and subjected to an immense heat from five to seven hours. By this time the whole is a liquid mass; the base metals being the lighter, are skimmed off, forming those ugly hlocks you see, called slag. The gold, silver and copper remain together and are drawn off into beds of sands, and when cold, are hlack, unshapely lumps, called matte. We will not follow these into the mill, where they are ground as fine as flour, for the dust is intolerable. But we see here the black flour as it comes from the mill; we see it again roasted in furnaces; we see it taken to a department where it is placed in large wooden tubs or barrels; streams of hot water are run through these, carrying with it, through a wooden spigot at the bottom of each barrel, the pure silver which is deposited in wooden troughs lined with copper. The last roasting had formed sulphate of silver, and the hot water had liberated the silver from the solution. The silver, 999 $\frac{1}{2}$ fine, has only to be taken out at intervals, the glittering white flour is pressed into cakes, melted and run into bars, which are sold in New York above the mint silver. The remainder in the tubs is gold and copper. We have seen now as far as we can see. The separation of these metals is the great secret of these works, and is performed entirely by Prof. Richard Pearce, the discoverer of the process. But we are informed that in some mysterious way the pure gold is separated from the copper; that the remainder is 75% copper, and is finally converted into pure copper bars, and that the gold and silver product for the year 1877 will be \$2,250,000 and the copper \$100,000. Five huge furnaces keep their fires burning day and night, seven days of the week. One hundred men labor unceasingly by relays, and \$6,500 of metals are turned out every 24 hours. It is a big bonanza for its Boston owners.

Causes of Hard Times in England.

Mr. Cowen has turned the annual dinner of a Commercial Travelers' Association to useful account by stating his theory of the causes of the present distress. In Mr. Cowen's opinion, the crisis under which trade is supposed to be suffering just now is simply a repetition in cause and effect of the railway crisis of 1846. "English capitalists, under cover of State loans, have been over-speculating in railways abroad, just as they over-speculated in railways at home 30 years ago, and with a similar result." Nearly \$500,000,000 have been lent to foreign governments and foreign companies during the last few years, and the greater part of this money has gone to making railways and other public works. These railways have not paid the dividends expected of them, and in many cases the lines themselves have never been opened, so that the money spent in beginning them has been wholly wasted. The sudden cessation of enterprise abroad has not only involved many English capitalists in heavy losses, but has also brought temporary ruin upon other capitalists who were merely supplying them with goods. In 1872, 975,000 tons of iron and steel were exported to the United States. In 1876, the export was only 100,000 tons. That is a very serious change to pass over an important industry in so short a space of time. It came so suddenly that there was no time to make preparation against the storm, and the losses of the men who had been accustomed to turn a profit on 975,000 tons of iron instead of on only 100,000 tons have to be added to the losses of the men whose money has gone to pay for all that weight of metal now lying useless in unfinished railroads all over the world.

This is Mr. Cowen's reason for looking hopefully upon the commercial future. A crisis which is produced by overtrading passes away after a time. New capital comes into existence, and for a time, at all events, it is employed with more prudence and judgment. This has been the case with all the former depressions traceable to this cause and if the present depression can

fairly be attributed to overtrading, there is no reason to doubt that it will disappear in the same way. Of course Mr. Cowen's prediction will count for nothing if it can be shown that the present depression has a different origin from those that have gone before it. But there is no need to wander afield in search of a new cause, when the old cause is there to explain the phenomena. That England has been overtrading again cannot be denied; that she has suffered cannot be denied. Why should we suppose that the connection between the two facts suspended, or assume that the suffering which in former years came from overtrading now comes from some more occult cause?—*London Spectator.*

Deep Snow on the Mountains.

Abe Richie, who left Woodfords, early in March, to visit various fishing camps and other localities on the summit of the Sierra Nevada, writes to the *Territorial Enterprise* an account of his trip, of which the following contains the salient points:

Leaving Woodfords on the morning of the 1st, the snow at the Shingle mill, three miles above, was found to be three feet deep; at the lower end of Hope valley, nine feet, and at the upper end, 11 feet deep and packed very solid. At Red lake, three miles above the head of the valley, it is 14 feet deep, and on the summit, at the old Kit Carson tree, 16 feet. At Twin lakes, four miles west of the summit, 15 feet (head waters of the American river). At the Carson Spur the snow is 50 feet deep, but will average about 20 feet. It is impossible to go around the spur now without shoveling a trail through. The snow has drifted over the mountain so that it is nearly perpendicular at the most dangerous point.

At Silver lake the snow is 15 feet deep and well packed. I do not think the road will be open for teams before July. There is more snow in the mountains than there has been since 1861-62. In 1871-72 it was two feet short of what it is now. The snow on the western slope is deeper than on this side. There will be plenty of water in all the streams this season. The canyons are all drifted full, from 20 to 75 feet deep. There are a few trees with the tops still sticking out of the snow, that I wish were covered up, so that I could have a good snow-shoeing. It is snowing to-night, with a fair prospect of getting a few feet more. The fishing at Silver lake is good. They have to shovel a hole in the snow about 12 feet deep and then cut a hole in the ice two feet thick, and then the little silver beauties come to the surface to see what is going on. In the fore part of the winter, we had to fish in deep water, but now they come to the surface near enough to be seen. I think it is the light that attracts them.

The dairymen will not get up into the mountains before the middle of June, this year, but they will have an abundance of feed. I think we will have the best fishing the coming summer that we have had for years in Hope valley. A man is here who is just in from the Silver King wood camps, and he says the snow is from 10 to 40 feet deep up there. It is the east fork of the Carson river. There will be no scarcity of water this summer to get the wood out.

The Golden Chariot.

The Golden Chariot mine, once the "king pin" of the Idaho stocks listed on the boards, did not pay any dividends last year, but the assessments were comparatively light and there is a balance in the bank. The mine at one time paid dividends, and then levied assessments consecutively for so many months that the stock dropped to nothing, and nobody would have anything to do with it, much to the detriment of the Idaho mining interests. In fact, the management of this property a few years back was so bad as to disgust the people here with all Idaho mines, and hurt the Territory very materially. During the past year, however, the mine has kept well within its means, and has some surplus on hand. The following statement shows the results of the year up to March 1st:

RECEIPTS.	
Three assessments of 50 cents.....	\$133,444 39
Bullion.....	33,332 49
Proceeds for crushing custom ore.....	2,652 00
Bills payable, loan from S. Greenwald.....	45,000 00
Total.....	\$214,428 88
DISBURSEMENTS.	
Office furniture.....	\$295 60
Bills payable.....	49,611 49
Expense account.....	3,953 08
De Neon, Supt., February account.....	4,563 77
Machinery.....	153 90
General expense.....	8,313 57
Salary.....	10,200 00
Wood.....	22,903 73
Interest.....	2,032 65
Freight.....	1,779 72
Lumber.....	1,455 74
Supplies.....	23,763 29
Telegraph.....	42 75
Traveling expenses.....	500 00
Assay account.....	368 00
Labor account.....	66,095 93
Ground purchased.....	3,000 00
Hauling and contract.....	2,729 17
Taxes.....	2,724 40
Discount.....	101 60
Total.....	\$205,028 39
Balance on hand in bank.....	9,400 49
Total.....	\$214,428 88

MECHANICAL PROGRESS.

The Influence of Vibration on Steel.

Hitherto, says the *Engineer*, it has almost invariably been assumed that the softer a bar of steel was the more likely was it to endure strains and shocks causing vibration. Steel is a metal of anomalies and surprises, and recent investigations carried out in the United States, by Mr. W. Metcalf, of the Crescent Steel Works, Pittsburgh, appear to show that popular opinion is wrong, and that the hard steels suffer less from vibration than the soft steels. Mr. Metcalf's attention was first called to the matter by the constant breakage of steam hammer piston rods. These, made of ordinary steel, lasted but six months, an iron rod breaking in half that time. Then lower and lower steels were tried, and broke in about five months. An accident caused the hurried use of a rod made of comparatively high steel; it was assumed that it would not last more than a week or two, but it actually held out for more than two years. Subsequently a lot of small steel connecting rods were tested in a special machine. The test required was that a machine should run four and a half hours, at a rate of 1,200 revolutions per minute, unloaded, before the connecting rod broke. These rods were unforged in the middle, and consisted of a piece of straight round bar, with a head welded on each end, the middle of the piece being left as it came from the rolls. This explanation is necessary in order that it may be understood that no accident of forging affected the results. "The mode of rupture was," says Mr. Metcalf, "as a rule, the same in all cases; the rod heated at the middle, where the vibrations met, as they were imparted by rotary motion at one end, and by reciprocating motion at the other, and by alternating strains of compression and extension. In some cases the rod became slightly red-hot at the middle before rupture. After heating, the next thing observed was the raising or loosening of the surface scale of the middle. Soon after this rupture began, first at the surface and gradually extending to the center, until finally the rupture took place. The breaking was gradual in every case, no piece breaking suddenly, even of the highest steel. The first trial was with .53 carbon steel: Mean time of six trials, two hours, nine and one-eighth minutes. Second trial, .65 carbon steel: Mean time of six trials, two hours, 57½ minutes. Third trial, .85 carbon steel: Mean time of three trials, nine hours, 45 minutes, and the trials were stopped."

MECHANICAL IMPROVEMENTS IN THE NAVY YARDS.—The *Iron Age* says that the Secretary of the Navy made a careful test of some specimens of iron manufactured in the navy yard at Washington, and is investigating the question of the cost of fitting up the necessary smelting apparatus there for the purpose of making iron, both scraps and ore. There is a vast accumulation of scrap iron yearly at all the navy yards, which is said to be usually sold at about one-tenth its value, and which might be readily utilized if the necessary furnaces were erected. The Secretary has also ordered tests to be made of a new composition which the inventor claims will neither corrode nor change its color, and which is almost the hue of gold. It is claimed that it can be substituted for sheathing copper with great advantage, as it is many degrees lighter than copper; that it can be utilized for a vast number of purposes on shipboard where other metals cannot be so well used, as the composition will always retain its bright, rich appearance. The inventor has submitted to the Secretary a number of manufactured articles of this material, and also metal in the rough, which has been sent to the navy yard for the purpose of seeing whether it will come up to what is claimed for it as a valuable material for ship use. Its comparative cheapness, in case it proves useful, will make it a desideratum in the construction and sheathing of vessels.

BRIDGE TESTING IN CONNECTICUT.—The *Chicago Railway Review* says: "A car for bridge testing is to be purchased by the State of Connecticut, and it will probably lessen the number of accidents of the Ashtabula order within the boundaries of that State at least. The car is to be used on every railroad bridge in the State at least twice a year. It consists of an iron tank resting upon three trucks, the tank being capable of holding 80 tons of water. On the center truck are four hydraulic jacks, operated by one lever, and by these the entire weight of car and contents can be thrown upon the center truck. In case a weakness is discovered, the floodgates are opened by a single lever and the water instantly let off, relieving the bridge of 80 tons weight. The car will weigh about 60 tons, and when the 80 tons of water are added, the full test will be 140 tons. This weight may be lessened, of course, if desired."

OUR FLOUR MILLS.—Our milling industry, the *American Miller* maintains, ranks next to that of iron. The number of mills is over 25,000, affording employment for more than 60,000 men, whose annual wages are about \$20,000,000, and turning out yearly 50,000,000 barrels of flour, of which 4,000,000 barrels are exported to foreign countries. Pennsylvania has the most mills (nearly 3,000), New York stands next with about 2,000, and other States follow with from 700 to less than 100. Minnesota's mills are the largest, and employ the greatest average number of men, namely, five in each.

Improvement in Nail Machinery.

We read that a machine has been introduced in Birmingham, England, which produces from strip iron nails similar to hand-made, at rates varying from two to three hundred per minute, and lengths of from six inches to one inch, two nails being completed at each revolution of the driving shaft of the machine, the quality of the nails thus produced being in all respects first-class.

The framing in this case consists chiefly of a main casting, to which are affixed an upper frame, carriages for the driving shaft, and other details. The principal moving part is a heavy steel slide, deriving its motion from a crank pin with adjustable throw; this slide carries two shears, two gripping dies and sundry indispensable appendages, to some of which it imparts motions for guiding the nails between the stages of cutting off the finishing. The successive operations by which each nail is perfected are described as follows:

A piece of iron about six inches long, and of a width and thickness somewhat greater than the length and thickness respectively of the finished nail, is inserted at a red heat to the feeder of the machine; a narrow strip is immediately cut off the lower side of the heated iron, and by the motion of the steel slide is carried to and pressed against a fixed die; and while in this position another die rises at right angles, and presses the partially formed nail against another fixed die. Thus the headless nail is firmly held on its four sides, and while in this relation a lever, moved by a cam, and carrying a suitable tool, advances and forms the head, thus completing the nail. The return motion of the steel slide releases the nail, leaving it free to fall—the latter movement being aided by a knock-off.

CHROME STEEL FROM THE BESSEMER CONVERTER.—The Sheffield correspondent of the *Engineer* contributes to that journal the following: "I am told that the chrome steel of Messrs. John Brown & Co., made in the Bessemer converter in the usual way, but by a particular process, has proved a most reliable material for tools, which have been tried for lathe and other purposes, and have answered the most sanguine expectations which had been formed of them. Some tools made from this steel have been put through tests for temper, hardness, and 'body,' which were severe—and are still at work. In saying this, I simply record a fact which is of no little interest to persons in all branches of trade. I also hear that a leading local firm which has long had a distinctive reputation for their charcoal and other wrought iron ship plates, are now so thoroughly convinced of the great future there is in store for steel, that they are making considerable alterations in their Bessemer houses, so as to enable them in the future to turn out a class of steel, which they can aver is of any required temper and tenacity."

POLE RAILROADS.—The loggers in the Wisconsin pineries this winter have been driven by the absence of snow to find something besides sleds to haul their logs. One device is a pole railroad, which is thus described in the *La Crosse Republican and Leader*: "Flat cars are made of sufficient strength to hold a number of logs, and are provided with wheels. The rails that these cars run on are common poles, bolted together at the ends and are kept in position by the grooved wheels. The poles are laid on the bare ground, no other ties being necessary, and all that is necessary is in some instances to level the ground. It costs but little to lay the track, which can easily be moved, and is not apt to get out of repair. The cars are drawn by horses and are reported to move easily with heavy loads, while the device on the whole is said to be giving the greatest satisfaction both in its working and in the cost of operation."

A TRACK-LAYING MACHINE.—What is called a track laying machine has lately been constructed, and its adaptation to the purpose carefully tested. It is composed of a succession of rollers act in movable frames attached at will to the sides of several flat cars in a train, elevated so as to form an inclined plane from rear to front. Upon these, the ties on one side and the rails on the other, are readily rolled or laid by the workmen upon the cars, when they move along over the rollers to the front, and are delivered to the tie and track layers as fast as they can use them. The object of this arrangement is to obviate the necessity of teams for the distribution of ties along the road bed, especially over rough or swampy ground, and also to save extra handling of the iron, as by the present way, thus insuring both rapidity and economy.

RIVER VS. RAIL.—The *Louisville Courier-Journal* says of the J. B. Williams' "boss" tow, that it was "the largest tow ever taken from Louisville to New Orleans, or any other place in the world—making 22,200 tons. Her freight bill at three cents per bushel, amounts to \$18,000, equal to 81 cents per ton. It would take 1,800 cars of 333 bushels to the car to transport this amount of coal. At \$10 per ton, or \$100 per car, the freight bill by rail would amount to \$180,000, or \$162,000 more by rail than by river. The tow can be taken from Pittsburgh to New Orleans in 14 or 15 days. It would require 100 trains of 18 cars to the train to transport this 600,000 bushels of coal, and if it makes the usual speed of fast freight lines, it would take all summer to put it through by rail."

SCIENTIFIC PROGRESS.

The Epoch of the Mammoth.

Under this title a highly interesting volume, bearing upon the validity or otherwise of the evolution theory, has just been completed by Dr. Southall, an Englishman. His studies of the evidence concerning the occurrence of man on the earth, lead him to approve the Biblical record and to refute Darwinism. It is very certain, says Dr. Southall, that at some undefined period in the past man was to be found all over Europe, south of the Baltic and the line of 54° latitude in England, living in caves, and elephants and rhinoceroses, lions and hyenas, reindeer and hippopotamini abounded in all this region at that time. It is equally certain, he continues, that some time after the race had been thus spread over Europe a great flood covered a large portion of the continent with water, and that the same deluge submerged large districts of country in America and in Asia. This was the flood of the *Lees*, which closed the Paleolithic age. It was probably subsequent to the Noachian deluge, which was probably local in its character, and more serious in its effects within its range. It is extremely doubtful, he thinks, whether previous to this, the Biblical deluge, the human race had left their original home. They were probably up to that time shut in by the ice and the sea to a very limited area. There was an African Mediterranean sea covering the space now occupied by the northern Sahara, and an Asiatic Mediterranean sea, of which the Caspian and the Aral and the Black sea are the shrunken relics. Far to the south the reign of ice prevailed in Europe, and the Northern ocean rolled far over Russia and Siberia. The Arabian and Nubian deserts, with the snow-capped mountains of Abyssinia and the east coast of Africa, formed, it is not unlikely, a barrier in that direction. There were glaciers in the Lebanon, glaciers in the Atlas, and glaciers in Anatolia. The Himalaya mountains constituted a barrier towards India, and the elevated plateau of Central Asia shut out China on the east, a greater portion of which was probably under water, as was north-western India; central India, like the western part of North America, being at the same time the theater of terrible volcanic convulsions. Such was the geology and zoology of the earth when man appeared.

The various researches which have been from time to time made in connection with the lake dwellings, the *kjokken-moddings*, bone caves, and gravel deposits are carefully recorded and discussed; and Dr. Southall shows almost unanswerably that man must have been created in civilized condition in accordance with the Biblical record, incidentally mentioning that even Cain was capable of building a city, and that only a few generations afterwards Noah went down to Egypt and found it an organized state; in short he shows that both evidence and investigation demonstrate that man appeared upon the earth abruptly and in a civilized condition less than 10,000 years ago, so that all the evolution theories are distinctly negated.

A NEW LECTURE EXPERIMENT ON PRUSSIC ACID.—A very simple method of showing that there is no free hydrocyanic acid in the kernels of peach, cherry and plum stones, or bitter almonds, but that it is formed on heating the same with water, is given in the *Polytechnisches Notizblatt*. A long strip of Swedish filter paper is soaked in tincture of gum guaiacum (1 to 20) and dried. It is next passed through a solution of sulphate of copper diluted 2,000 times, when the paper will not be changed at all in color. A few freshly-pounded bitter almonds are put in a two-liter flask with water. On suspending in it the strip of test paper above described, the paper will remain white, but on pouring into the flask a single crushed bitter almond that has been warmed with water, the test paper will at once be colored blue by the hydrocyanic acid generated in the flask, without bringing the paper in contact with the liquid. This experiment, unlike most of those which can be shown with hydrocyanic acid and its salts, is free from danger to the experimenter, and involving no risk or expense deserves the attention of teachers of chemistry.

STENOGRAPHY.—Our short-hand experts are still laboring to improve not only their own methods for reporting, but are devising a new style of print which they promise will be a vast improvement over that now in use. So far has the movement progressed that, we notice, a quarterly magazine has been begun by J. B. & E. G. Smith, of Amherst, Mass., which we have no doubt will be interesting to all who are devoted to "reform in orthography," etc. It is called the *Kirografaer and Stenografer*.

SODIUM AMALGAM.—For the preparation of sodium amalgam without danger, Mr. Henry N. Draper recommends, in the *Chemical News*, that the mercury be allowed to run in a thin stream to the melted sodium held in a bath of paraffine. The quantity of mercury added depends whether solid or liquid amalgam is desired. The former congeals sooner than the paraffine, and the latter can be poured off. The paraffine still adhering to the amalgam is washed off by means of ether.

ORNITHOLOGICAL.—The qualities of the English sparrow have been widely considered of late years, since its large increase in this country. A monograph entitled, "The House Sparrow at Home and Abroad," is the latest and most scientific treatise on the subject. It is written by Thomas G. Gentry, and published by Claxton, Remsen & Haffelfinger, of Philadelphia. Beginning with an excellent colored plate of the bird, it follows with careful scientific examination of its standing in Europe and American, and adduces all the points which have been advanced in this country bearing upon the qualities of the bird for good or evil. The conclusion is decidedly against the bird, as it is now protected and pampered in our cities. By bounteous feeding with grain, at the hands of municipalities and individuals, it ceases its insectivorous character, and instead of serving us in the reduction of injurious insects, it becomes an arrogant free luncher on grain and seeds, and insects multiply, because it dares not feed upon them. As it spreads from city to country, it maintains its grainivorous habits, and becomes a pest of the grain fields, gardens and orchards. Not only does it refuse to eat insects itself, but by its increase pushing our native insectivorous birds to the wall. Mr. Gentry builds his argument upon such premises, and claims that the bird should be no longer petted and protected, but should be either repressed or permitted to fight its own way forward, and forced by hunger to resume its original insectivorous habit. The subject is an important one, and Mr. Gentry's treatise upon it should be widely read. The evil which he sets forth should be put to the test of truth both by ornithologists, and the observation of practical men.

THE FUNCTIONS OF VINE LEAVES.—A continued series of investigations, says the *Journal of Chemistry*, have convinced M. Macagno that a most important part in the formation of the fruit is performed by this portion of the tree. A vast number of analyses show that the leaves contain glucose (grape sugar) and cream of tartar, substances which enter largely into the composition of the grape. He found, in the month of June, in one kilo of them, 14.24 grammes of the former and 7.41 grammes of the latter. As the season advanced, those quantities augmented, until at the period of the vintage they had nearly doubled. He also found them in the branches, but in smaller proportions, and he concludes that the leaves are the laboratory in which the first material of the fruit is formed, and that from them it is conducted by the branches to the bunches. After the grapes had ripened, the quantity of the substances mentioned ceased, almost immediately, in the leaves. In consequence of those facts he recommends vine-growers to abandon the practice of *nipping*, which consists in suppressing, in the early part of July, the tops of the fruit-bearing branches, at three or four leaves above the highest bunch. In July last, he nipped 20 trees in a vineyard in full culture, and left the neighboring stocks in their natural condition. The analysis he made on the 27th of September showed that the latter had produced, per kilo, 620 grammes of pulp, while the others had only 581 grammes, and the proportions of saccharine matter was 175 grammes and 140 grammes.

LAMPS FOR ELECTRIC LIGHT.—The improvements proposed by Messrs. Prosser and Moore, of Chelsea, England, consists in the modes of combining and mounting the electrodes, also in the mode of forming them and in the means of bringing them successively into action in such manner as to prevent the suspension of the current of electricity and consequent extinction of the light, arising either from defective electrodes or other accidental causes. The extinction of the light would, therefore, be entirely avoided and the electric current, together with the light, be automatically maintained. As by our ordinary modes of arranging the electrodes, we require only two electrodes to be in action at one and the same time, we cause those not in immediate action (where we employ a plurality of them) to be completely insulated and cause the electric current to pass through the opposing electrodes, the electric fluid being conducted through an ordinary feeder from the battery and connected with the electrodes by means of a spring commutator or other connector of platinum or other suitable metal, which, preserving contact by pressing upon the electrodes in immediate action, is so arranged and adjusted that when it is necessary to change or shift the electrodes from any cause, contact shall at once be effected with the succeeding electrodes, so that the perfect continuity of the electric current, and, consequently, of the light shall be maintained.

PHOTOGRAPHING WITH LIGHTNING.—Mr. A. J. Jarmin communicates to the *Photographic News* an account of experiments made to take negatives during a thunderstorm. He sensitized a plate in the usual way and placed it at the back of a negative. Four flashes of lightning were counted, and upon developing, the image came out as clear and quick as if taken by ordinary daylight. One flash with a weak negative gave a fair transparency. He next tried with the camera, after getting everything nicely in focus, through the studio window, which was done by the aid of lightning, he obtained a photograph with 20 flashes, the view being down a street. The experiment proves that the chemical process of lightning is equal to the electric light produced artificially and nearly equal to daylight. Photographs of the electric spark itself have been taken by aid of a Ruhmkorff coil.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

RESUMED.—*Chronicle*, March 16: Work has this week been inaugurated at the Schenectady mine and mill by the new purchasers—a San Francisco company—under the Superintendency of N. J. Coleman, late of the Kossuth mine. The mill is being put in running order.

AND AGAIN.—The realty belonging to the English companies that have been doing business here will not be sold to-day by the Sheriff, who has received orders to again postpone the sale.

AMADOR.

GRAVEL.—*Dispatch*, March 23: D. H. Rule is preparing to work his rich and extensive gravel claim on Rancheria creek by hydraulic power.

LINCOLN.—*Ledger*, March 23: The third clean-up since the resumption of work was made this week, and panned out better than either of the previous runs. Everything is thrifty and prosperous, with an ore body 15 feet in thickness to operate upon. The past history of this property has been one of vicissitude. Its machinery is of the most improved pattern. There is some foundation for the hope that the era of dividends, long deferred, is about to dawn upon the stockholders.

A CAVE.—Just as Owen Kelly got his gravel claim near Volcano ready to commence washing, 100 feet of the bank came down and buried it so deeply that it will take several weeks to exhume it.

THE AMADOR CANAL.—The mine owners and mill men who are dependent upon the Amador canal for their water supply, are a trifle out of humor with the company on account of the frequency of breaks in the canal, and the consequent stoppage of their mines and mills. The ditch, has broken three or four times within a week, and as there is no reservoir to fall back upon, the mines have had to take to steam, or remain idle until the breaks could be repaired.

PLYMOUTH.—The water is low in the Cosumnes river and in the creeks. Considerable free gold has been picked up on the surface in the gulches and ravines in this section of the county.

CALAVERAS.

MINING ITEMS.—*Chronicle*, March 23: The Gwin mine never looked better than at present. There are 60 men working at the mine.

PHILLIPS, SEAYER & Co. have nearly completed their ditch and will get to piping in a short time.

DODGE & Co. have commenced erecting a whim at the Asbestos claim. The shaft has 90 feet of water in it.

GRAVEL MINING.—Unwonted activity is observable in gravel mining operations. There is a plethora of water, and work is progressing favorably in all the claims in this vicinity, albeit in some instances difficulty has been experienced by labor strikes. At the Duryea mine, in Chile gulch, only a small force of hands is working, it having become necessary to repair the main tunnel. The stoppage is temporary. Everything is progressing favorably at the Garland mine, Chile gulch. A full force of men is employed and the mill is kept constantly in motion. Results are said to be eminently satisfactory. Brown and McSorley, proprietors of an extensive tunnel claim in Tunnel ridge, are pressing operations with vigor and meeting a handsome reward for their labor and outlay. In Veith's mammoth hydraulic, Tunnel ridge, there is no cessation of operations. There is not a more vigorously worked mine in the State, nor one that pays better in proportion to the quantity of gravel washed. Moser & Co., Sport hill, are putting an immense amount of gravel through their flume daily. They have been piping steadily since the rains set in and are now getting ready to clean-up. We expect to have a heavy yield to chronicle when they unload their sluices. Emerson, proprietor of the Happy Valley hydraulic, one of the most extensive and best worked gravel mines in the county, continues operations uninterruptedly. From 400 to 500 inches of water is used in the Happy Valley claim, and a large number of hands employed. The prospects for a large yield are encouraging. Silter & Co., located in Old Woman's gulch, are working away vigorously. They contemplate the erection of a mill to crush their gravel. A mill will undoubtedly largely increase the yield of the mine, as the gravel is so hard that it does not wash well without crushing. Cook, Raynor & Cook, owners of the well-known Calaveras hydraulic, have been steadily at work all winter. They have free water, an abundance of it. The prospects for a remunerative "run" are excellent. The old "Gopher claim," at Buckeye, is being more extensively worked this season than ever before, and has been giving a good account of itself all winter. W. W. Cook has lately opened a hydraulic in the vicinity of Rich Gulch Flat, which promises to prove a good paying institution.

EL DORADO.

PLACERVILLE GOLD QUARTZ COMPANY.—*Mountain Democrat*, March 23: Some three months ago the Pacific quartz mine at this place passed into the possession of a London company, who, encouraged by results of its early workings, will soon commence operations

on a large scale, the mine being undoubtedly one of the best in the country.

INYO.

NEW MILLS.—*Independent*, March 16: The Rex Montis, since the 7th instant, has been running on tailings, from which Superintendent Hutchings expects to begin shipping bullion next week. The new batteries are not yet set up, there being plenty of time to complete them and the new mill generally by the time ore can be got down the snow-covered trail from the mine. All the machinery and material required for the complete mill is now on the ground. Work in the mine goes on continuously, but no more ore is being taken out, to absorb moisture on the exposed dump, than circumstances in opening up make necessary.

DEFIANCE.—*Coso Mining News*, March 16: Although we have made no reports of late on this mine, operations to a greater or less degree have been carried on, and the exploitations made have been of such a character as to convince the most incredulous that the Defiance is a mine of permanency and great value. The Defiance furnaces will be started up next Monday, and the prospects for a long run are first-class.

SLATE RANGE MINES.—Situated in a southerly direction from this place about 30 or 35 miles is the Slate Range mining district, which has within its confines some very excellent mines, for several of which their owners have applied for patents.

BULLION PRODUCED.—During the year 1877, the Modoc Con. Mining Co., produced \$631,312.60; and the New Coso Mining Co., \$438,400. The former is located at Lookout, 12 miles from Darwin, and the latter about four miles from the town. The bullion was silver-lead produced by furnaces.

NEVADA.

FINE PROSPECTS.—*Transcript*, March 24: The New England and New Brunswick mines, one mile from Nevada City, are located on the same lode and have both developed a fine body of pay quartz, hoisting through the same incline. At present, ore is being taken from three levels—the 150, the 250 and the 350 levels. Another is being sunk 100 feet deeper. The rock being raised is from the 350 level, Brunswick claim. The ledge is from 20 inches to two feet in thickness and shows well in sulphurets and galena. The ore raised each day is from 17 to 20 tons. Two wagons convey it to the Pioneer reduction works, where it is put through the Crosby process, now in successful operation. A 40-horse power engine is employed at the New England mine to run the machinery. An eight-inch pump keeps both mines free of water, discharging a constant stream of about nine inches. The Brunswick company are out of debt and will doubtless commence paying dividends shortly, as the character of the rock being taken out will far exceed the cost of mining and milling. The New England company, which has had to bear the expense of opening the mine, which at one time threatened to swamp the stockholders, can now see their way clear, and will, in a short time, have their mine entirely out of debt, and with its twin sister, the Brunswick, be placed among the dividend-paying mines of the county.

THE BURNS MINE, formerly the old Potosi, under its new management is looking remarkably well and it is believed will speedily come to the front as a dividend-paying institution. The reassertion of three old claims is strongly attracting the attention of capitalists to this neighborhood, as affording one of the best fields for investment on this coast.

GOLD FLAT.—This locality, one mile out of town, with the puffing of half a dozen engines, its hustle and improvements, is one of the liveliest camps we have seen for some time. The reliability of the mines here has induced the building of custom mills, and the miners and mill-men have built for themselves neat and comfortable residences, thus saving the time and fatigue of walking to and from town every morning and evening.

THE ALASKA MINING COMPANY.—*Grass Valley Union*, March 20: This company made a clean-up of 36 tons of ore on Monday, which yielded \$3,200, being nearly \$89 per ton. This rock comes from the stopes above the north drift of the 340 level. The mine is presenting a splendid appearance.

HYDRAULIC.—*Foothill Tidings*, March 23: The Oustomah hill claims are located about one mile from Nevada City. Seven hundred inches of water are employed, 500 of which are forced through one of Craig's monitors, six-inch nozzle. The other 200 are allowed to flow over the bank into a reservoir, used during the night to run off the gravel made by the caving of the bank during the day. So at night 1,000 inches of water are used and 500 inches in the day time. The bank where the company is now working is about 100 feet high. The gravel on the bottom is very hard, but the continual piping finally undermines the bank, and it comes crashing down, thoroughly broken up and soon disappears down the long line of the flume that empties into Wood's ravine.

PLACER.

QUARTZ MINING.—*Herald*, March 23: Considerable prospecting is now going on among the ledges of this and Ophir districts, as is evidenced from the fact that Pugh's mill, the Eclipse mill and the mill of Simon's & Co., in North ravine, are kept running most of the time on custom rock. No particularly rich strike has been made lately, though a number of the ledges worked are paying fair returns.

The St. Patrick mine and mill, which have been lying idle for some time, are again in full blast. Men have been at work for some time, and had, up to last Monday, taken out about 150 tons of rock, when the mill was started up. The drifts and shafts having caved some while the mine was lying idle, it will take some time to get these in a condition that will admit of working to advantage, but when that is done we understand it is the intention to put on men enough to keep the mill running constantly. The 20-stamp mill at Schnabel's mine, on Jenny Lind flat, below Newcastle, has been running steadily for some time, and the mine is now so thoroughly opened that the mill need not stop again, except for repairs or for cleaning up, for many years to come. They are now down 440 feet, where the ledge is from eight to nine feet thick, and the rock richer than any above. They work, all told, about 40 men, and hoist and crush, on an average, 25 tons per day, which yields a fair profit over and above all expenses.

PLUMAS.

MINING ITEMS.—*National*, March 16th: Keller & Co. are sinking a shaft to prospect a gravel channel near Jackass gulch. Bell & Co. are getting some good prospects in the old Western claim near Newtown. The water has commenced running at Hungarian hill, and work for the season has started up. Hungarian will give a good account of itself this year. The Plumas Ditch company expect to have the water through the big ditch in a few days. They have had 16 men at work on it for some time. The Blue Gravel company, near Nelson, are running three shifts on an incline tunnel. The gravel is A No. 1, and the boys are in good spirits. Kimball & Crowell, at Knob hill, washed up a little of their drift-dirt last week, and the rifles looked decidedly healthy. The lessees of Garland's Lava bed claims, above Spanish ranch, Stiles & Barstow, cleaned up \$800 from a 64 hours' run of the pipe, last week. They have very rich gravel, but the lava-cap is somewhat of a drawback.

SHASTA.

THE HAYWARD MINE.—*Reading Independent*, March 21: Never before in the history of our county has the mining interest looked so well, although in early days our miners became rich in a few days by finding a pocket or crevice, and confined themselves to gulches, ravines, creeks, beds, etc. Now they are more practical, opening out the many gravel hills and quartz ledges numerous in our county. Mr. Hayward, who spent several thousand dollars in a ditch from the head waters of Cottowood, to work the gravel mines about Igo and Piety Hill, is now reaping his reward in taking out large amounts of gold, and to those that were not able to undertake such a large enterprise the company sell water and give them all a chance, and all are doing well.

OTHER CAMPS.—At Centerville, Middletown, Clear creek and North fork of Flat creek, the miners having had a favorable winter, are all doing well.

AT COPPER CITY.—Crane & Co. are making preparations for building their sawmill, quartz mill and other works. We saw four loads of machinery loaded Sunday for the company, and they are anxious to get it all up, so they can show San Francisco people and others that we will have lots of bullion to ship to them. This company, and several others in the vicinity, have good quartz mines, and this camp will soon be a lively and productive one.

SIERRA.

SIERRA BUTTES.—*Mountain Messenger*, March 23: This mine is well supplied with water from Sardine lake, and 91 out of 96 stamps are running; and if we had a good freezing spell, which has never failed after heavy storms, the mills would not stop again this year. Two hundred and ten men are employed. Under the direction of Superintendent Johns, E. M. Preston and I. B. Inch, everything runs as smoothly and accurately as clock-work. The Independence quartz ledge has been pierced by No. 6 tunnel, but thus far no definite or satisfactory returns have resulted therefrom. The water is drained through No. 6 tunnel. The snow has disappeared around Sierra City, and if the present warm weather continues, there will be little or none up here. H. Walthman, of San Francisco is visiting Mr. Preston for a few weeks, to acquire a knowledge of the *modus operandi* of operating a California gold quartz mine, as it is his intention to superintend the workings of a similar lode this year in Mexico. The miners everywhere throughout the county, below the line of the heavy snow belt, are getting to work, and there is no doubt but they will make an excellent showing this year in Sierra.

TRINITY.

WATER PLENTY.—Every water ditch in this vicinity is filled to its utmost capacity, something unknown for several years. Many claims are running day and night and the heart of the miners is made glad by the melting away of the heavy gravel banks. A more favorable outlook for placer mining could hardly be, and an unparalleled area of bedrock will be laid bare in this county between now and the time water fails.

A PAYING LEDGE.—Ritter & Hickey cleaned up their arastra on Eastnau gulch last week with encouraging results. It had been run 10 days, crushing about one ton per day, and the yield was 40 ounces. The ledge has been tapped with a tunnel, is about 15 inches wide, well defined and has every indication of permanency. It is located in the same range as the Deadwood

mines about a mile and a half distant, the two gulches heading nearly together. Mr. Ritter who was in town this week, thinks the quartz discoveries of that section are lasting and will be worked to a profit for a number of years. But little work has been done on Deadwood of late, owing to the storm, but prospecting will be commenced as soon as it clears up and continued during the summer months. Trotter & Co., are getting out rock and running their arastra. They expect to strike the big ledge in a few days with their tunnel.

TUOLUMNE.

CONFIDENCE.—*Independent*, March 23: The owners of this mine will, it is said, put it in condition for active operations this summer. This was one of the first veins in the county on which deep mining was attempted, and the large returns in the past prove conclusively that our veins improve with depth.

AT THE RIVERSIDE, a new vein has been struck, about two feet in width, which prospects very rich. The mill is running on good rock, and it is expected that the next clean-up will be the best they have ever had.

Nevada.

WASHOE DISTRICT.

OPHIR.—*Gold Hill News*, March 27: The north drift from crosscut No. 1, in the ore vein, on the 1900 level, at a distance of 42 feet from its starting point, past out of the ore, leaving it to the left. This drift is now to be driven in a straight course to the north line, after which crosscuts will be run to the westward to determine the full value of the ore body. Sinking the east winze below the 1900 level has been abandoned on account of a strong flow of water. A new winze is now to be sunk 50 feet farther to the northward, it being believed that the rock will be firmer at that point and less water found. Crosscut No. 3 on this level, 60 feet south of No. 2, has reached the ore vein, which so far has shown but little of value.

CON. VIRGINIA.—The south drift in the ore vein on the 1650 level still continues in rich ore. On the 1850 level the south drift and winze No. 2 has been connected, and the most of the week consumed in putting in a working station and getting ready to crosscut the ore vein at that point.

SENATOR.—The header of the Sutro tunnel, which is now passing through the Senator ground, is in very promising vein matter, showing occasional streaks of low-grade ore.

CALIFORNIA.—Daily yield, 650 tons of ore. The face of the north drift on the 1650 level continues in hard blasting rock. A north drift has been started on the west side of the ore body on the 1750 level, which is following the west clay wall. Sinking the joint winze below the 1840 level on the Ophir line is making the usual fair rate of progress. The east drift on the 1950 level is steadily advancing, the face in vein porphyry.

JUSTICE.—Daily yield, 180 tons of ore. The ore stopes are looking well in every part and are yielding good ore. The bullion yield for March will not fall much short of \$100,000. The ore stopes recently opened on the 1150 level going south are showing well. The rich streak of ore going southward 60 feet below the 800 level is also yielding rich ore.

SIERRA NEVADA.—The east drift, on the 1700 level, has reached the soft vein matter in which the diamond drill was recently lost, which has so far proven itself a body of tough clay mixed with quartz boulders and pebbles of a favorable character; as to what may lay beyond this wall of clay remains yet to be seen.

LADY WASHINGTON.—The north drift from the Justice line on the 1000 level is steadily advancing, the face still in quartz and good ore of a good quality.

SILVER HILL.—The south drift looks well, the quartz in the face being of a good character, and small portions of it assaying \$300 to \$380 to the ton.

CROWN POINT.—The strong flow of water struck recently in the south drift on the 500 level has subsided sufficiently to permit of a resumption of work in the drift, which is now being cleaned out and repaired preparatory to being again advanced. Some of the quartz and sediment carried out by the flood give assays of \$6 and \$8 per ton.

CON. IMPERIAL.—Sinking the joint Alpha winze on the north line is making the best of progress. It is now down 390 feet, the bottom in good blasting ground.

SUTRO TUNNEL.—Occasional streaks of low grade ore are met with. The face of the tunnel is well into the Comstock ledge formation, and nearly into the Savage workings. Total length of tunnel last evening, 19,257 feet.

YELLOW JACKET.—The north winze below the 2200 level is down 112 feet, bottom in dry porphyry, with occasional seams of quartz. The new shaft is down 1325 feet. Somewhat slower progress is being made at present in sinking, owing to increasing hardness of the ground.

ALTA.—Sinking the main shaft is being pushed vigorously forward. It is now 15 feet below the 1300 level and will be pushed ahead as speedily as possible to reach a perpendicular depth of 1500 feet, by which time it is believed that the west wall of the ore vein will be reached.

BELCHER.—The south drift on the 2160 level is steadily advancing, the face still in quartz of a very favorable character. The upraise from the 1900 level will be connected with the south incline shaft in a day or two more, and a good ventilation of the entire mine to that depth secured.

OVERMAN.—The main east drift on the 1200 level is developing a large and magnificent body of quartz and low grade ore, with fair prospects that in running either north or south on it, ore of paying quality will be found.

JULIA CON.—The east drift on the 1800 level is making the usual fair rate of speed, the face in quartz and porphyry nixed. Much of the quartz in the face is of a dark, favorable character, and carries a large amount of the black sulphurets of iron.

GOULD & CURRY.—The machinery for the new large air compressor is nearly all on the ground, and is being put in position for use as rapidly as possible. This compressor is one of the largest on the Comstock, and will greatly expedite the prospecting operations on the lower levels when once it is in operation.

CALEDONIA.—The north drift on the 1600 level is showing some splendid quartz along with very favorable ore prospects.

HALE & NORCROSS.—The water is being beld steadily at a point 90 feet below the 2000 level, while the new pump bob is being strengthened by the bolting on of heavy iron straps.

UNION CON.—The north drift on the 1600 level is being steadily advanced at the rate of three feet per day, the face in clay and porphyry nixed.

MEXICAN.—Nothing is yet being done on the 1900 level, the north drift from the Ophir shaft still being quite hot.

BEST & BELCHER.—Sinking the joint winze on the northern boundary line below the 1700 level is being pushed ahead with all the vigor possible.

BELMONT DISTRICT.

LOOKING WELL.—*Courier*, March 24: The El Dorado South is yielding fine sulphurets ores, and they have a good body of it. The company's hoisting works, burnt down last fall, have been repaired by new ones of a superior kind. The Belmont company are also making some excellent ore developments, and with the prospect that one or more of the mills already erected there will soon be started up, and propose, also, that a furnace be constructed. Bullion shipments from Belmont cannot much longer be delayed.

ELY DISTRICT.

HIGHLAND FURNACE.—*Piche Record*, March 16: Company started their furnace on the 7th, and up to the morning of the 12th had run out 23 tons of bullion, which is supposed will average \$200 per ton. The principal ore worked is from the Huhn & Hunt, or Nevada mine, and according to all accounts it is running through splendidly. The furnace continues to work well and there is no doubt but what it will be a success.

RAYMOND & ELY.—Have commenced reopening some of the old levels, especially the eighth and ninth, for the purpose of doing some prospecting work in some unexplored ground out west; are also starting in on the 10th on an upraise. The pump is running regularly on half time; next week it will commence to run on full time; the water is down within 20 feet of the bottom of the shaft. The mill is running on tailings and Day ore.

MAYFLOWER continually improves, is looking better than ever before, and is in a good condition to extract ore in large quantities as soon as it can be shipped and worked.

DAY.—Work is being prosecuted in the upper and lower tunnels; the sinking of a winze from the upper tunnel, and drifting from it, where a large body of ore is being extracted. Prospects of the mine never better than now.

GREAT EASTERN.—Struck some nice carbonate ore in shaft at depth of 160 feet, which promises to develop into a large body as soon as the necessary work is done.

TEMPEST.—Work has been continued steadily on this mine, and the shaft is now down 45 feet, all in good ore. The mine continues to present an improved appearance.

HILLSIDE.—Are now down 90 feet on the shaft, the ledge showing up well and constantly improving. Work vigorously prosecuted.

EUREKA DISTRICT.

MINING ITEMS.—*Sentinel*, March 23: The vein in the east crosscut on the 250 level of the Hamburg mine has attained a width of 28 feet and the hanging wall has not yet been reached. It promises to be a magnificent deposit. The drift at the Jefferson is in ore. McDaniels is confident of good developments in a few days. An average of 500 tons of ore is daily transported over the Ruby Hill railroad.

COAL.—The workmen in the tunnel at the Palisade coal mine have, since encountering the vein, penetrated the strata a distance of 25 feet and are not yet through it. It is developing splendidly and the stockholders rejoice accordingly.

GALENA DISTRICT.

THE White & Shiloh company have their new furnaces in place and will mill and mine to their full capacity by the 1st of April. They have added about 50 men to their working force and will increase the white labor force to 100 men. Robert Schmitt, a few days ago, cut the richest galena ore ever found in the camp in the Cherokee mine. There is a foot of ore in the vein that assays from \$300 to \$400 per ton in silver. McBeth & Melander are working the Buena Vista mine, and have from six to 12 inches of very good ore. J. A. Blossom has a force of men taking out ore in the Trinity mine, and it now looks as if Galena would be livelier this summer than it has been for years.

LEWIS DISTRICT.

MINES AND MILLS.—*Silver State*, March 16:

There are now two mills here, one running and the other preparing to run. The latter is on the Grove & Starr mine, and when it does start, look out for heavy shipments of the "raw material"—they have the mine to produce it. Sam Grove has now at work about 40 men (not Chinamen), who are busily engaged erecting the mill, which is situated at the mouth of the canyon, where nearly a number of houses have been built in anticipation of a lively camp. Two miles up the canyon, at the Eagle mine, there is quite a lively little town.

A STRIKE has been made in the Mammoth mine, about a mile from the Eagle. The vein measures full six feet wide and is all pay ore. There is great excitement, and Mr. Brown, of Battle Mountain, has laid out a town and sold several lots, on which houses are now being built, and the signs portend a big camp.

Arizona.

MINING BRIEFS.—*Citizen*, March 16: The Miami mill is running at last, and ought to make lively times in that section of Globe district. The new brick furnaces are equal to the test they have been put to thus far.

SILVER KING.—Eighteen tons of concentration from this mine, and 4,000 pounds of Belcher and Crown Point ore have been shipped to San Francisco. Mr. Barnett expects to bring up the additional five-stamps and machinery for the King company's mill at the Picket Post.

A RICH STRIKE is reported in the Humboldt. VARIOUS MINES.—*Salt River Herald*, March 16: The old Vulture mine, once very rich, but so badly managed that it was for years idle, is again coming to the front, an energetic San Francisco Co. having taken hold of it. Several mines in the new Morse and the Cave Creek districts are opening well. The McMillan mine, in Globe district, is making heavy shipments of bullion.

THE McCracken.—*Miner*, March 15: This company, whose works are in Mohave county, shipped during the first days of this month, \$18,900 in bullion to San Francisco.

MASTERSON'S MILL, on Turkey creek, is running successfully on Goodwin ore. They have made a clean-up of several hundred dollars, the proceeds of a two or three days' run, in the way of experimenting.

AT AQUA FRIA.—The Kit Carson mine is furnishing the smelter with plenty of rich ore, and that the bullion is running out in quantities sufficient to satisfy the desires of all concerned in the mine.

THE MINES, throughout all parts of the Territory, are, so far as beard from, looking remarkably well.

Colorado.

GEORGETOWN.—*Boulder News*, March 22: The Terrible, the Boulder Nest, the Free American and Dundeburg are each producing from \$25,000 to \$30,000 per month. The owners of these mines are pushing right into the ground and taking out nice ore and abundance of it. The Baxter, the Dives & Pelican and many others are doing excellently. From \$8,000 to \$10,000 is paid out in Georgetown every day for ore.

DIVERS LOCALITIES.—The Great Eastern is producing some very rich ore. Rich ore in the 175 level of the John Jay. Small quantities of telluride ore from the Big Blossom and Grand Central lodes, in Boulder county, were sold at the smelting works in Central, last week, for over \$8 per pound.

WILL NOT PAY.—Prospectors from the Blue mountains report that they prospected five streams, reached bedrock in all, found colors in every instance, but did not find it in paying quantities anywhere. Saw plenty of fresh Indian "sign," but no Indians.

PLENTY OF LODES.—They claim to have in the Mount Sheffield district over 6,000 silver claims within a radius of 20 miles, good enough to induce assessment work, but not available on account of poor roads and lack of reduction works.

NEW FIND.—Rich discoveries are being reported from various points on the Big Thompson. There is quite an excitement over those said to have been made on Miller's fork of that creek.

Idaho.

FLORIDA MOUNTAIN.—*Avalanche*, March 23: The mines in this vicinity are again attracting attention, and the outlook for the coming season is brighter than it has been for a long time. Mr. Graham has a force of some 20 men at work at the Potosi and vicinity, and nearly 100 tons of first-class rock out. At a point about 65 feet north, in the Knickerbocker tunnel, the ore is richer than any yet taken out in previous operations, and there is an immense body of it. In the old Potosi works not far from the shaft, the ledge is yielding splendidly, the pay streak being about a foot and a half wide and liberally supplied with gold. Most of the rock now being extracted from the various points in the vicinity of the works will yield \$200 to the ton and upwards, and it seems to be conceded that a rich ore body of unlimited dimensions exists here.

OTHER POINTS.—From the Black Jack reports are unusually encouraging. There are 20 men at work there, and the engine will soon be operated day and night. It is reported that the Oro Fino will soon be in operation. The outlook at Atlanta is very encouraging for the coming season, also at Boise Basin, where much work is being done exploring the quartz lodes.

Montana.

PHILLIPSBURG.—*Butte Miner*, March 19: The

Hope company are running mine and mill without interruption, with an immense supply of ore in sight and are making regular shipments of bullion. Hollnand & Estill and Murray & Durfee are taking out excellent ore, for which they find ready sale at the Northwestern company's mill, which turned out 27,752 ounces of fine silver, worth \$31,082.24, during February, running 25 days. All the openings of the Trout mine are turning out ore of excellent quality, the most valuable coming from the 330 level, which, in addition to native silver, argentiferous blende, galena and copper pyrites, contains a very large percentage of ruby silver, choice samples of which go as high as 1,000 ounces of silver to the ton. Finding so large and well developed a body of ore of such exceptionally good quality, at so great a depth, is of great importance, not only to the Northwestern company, but to Phillipsburg as well, and, in fact, to the entire Territory.

News in Brief.

STATE ownership of the canals is proposed in Ohio.

J. SPRATT is erecting a large foundry at Victoria.

VIRGINIA has 39 living ex-members of Congress.

THE iron production of Russia is 320,000 tons per year.

DIPHTHERIA has again broken out in Fresno in fatal form.

A SHIP canal, costing \$2,000,000, is talked of across Cape Cod.

SEVERAL towns in this State have temperance tickets in the field.

THE total subscriptions to the 4 per cent bonds are \$3,612,600.

MAINE now ranks as the sixth State in lumbering; once she stood first.

THE naval appropriation bill has passed the House. It appropriates \$14,048,684.

A MAN named John Hushions dropped dead while at work in this city last week.

A MAN named A. Foley, died in this city last week from the effects of opium smoking.

THE city of Staunton, Va., population about 10,000, consumes 100 pounds of opium a week.

STRINGENT regulations for the preservation of salmon on Frazer river are about to be passed.

MR. WALLACE of Rawdon, N. S., has lost nine children within 16 days; disease, diphtheria.

R. H. TAPP, horse trainer, claims to have nearly subdued the man-eating stallion, "Cognac."

THE Lutherans, who have 75,000 members in Minnesota, exceed any other denomination in that State.

THE copper product of Michigan for 1877 footed up to 10,000 tons, a little more than the preceding year.

VINCENTE GARCIA, a noted criminal, who boasted of 25 murders, has been killed at Zamora, Mexico.

AN auxiliary branch of the Honest Money League of the Northwest has been established in Milwaukee.

THERE were 228 miners killed and 462 wounded in the anthracite coal region of Pennsylvania last year.

THE Winnemucca *Silver State* says 12,000 acres of land will be cultivated on the Big Meadows this year.

SUGAR-CANE grows well in all the valleys of southern Arizona, yielding a large percentage of saccharine matter.

SINCE the 1st of November, Chicago pork-packers have killed 1,944,000 hogs, against 1,414,534 last season.

IN New York, during the past year, nearly 1,000 cases of cruelty to horses were prosecuted by Mr. Bergh's society.

CORNELIUS CANAN, a boy seven years of age, was run over by a truck and instantly killed on Brannan street last week.

FIVE persons were killed and seven seriously wounded by the explosion of a boiler in a steam saw mill, in Richmond, Va.

A DEFAULTING water register at Cambridge, Mass., has been sentenced to three years in the penitentiary for official rascality.

THERE were 89 deaths in San Francisco last week. In the corresponding week of 1877 there were 98, seven violent ones.

WHEN a wealthy Jap breaks up housekeeping, he ships his kitchen furniture to America to be sold as "Rare curios from Japan."

DUSSELDORF, Germany, furnishes its citizens with filtered water at a low price, and the water-works are said to be profitable.

THE almond orchards in Santa Barbara are now worth seeing. They present a dense mass of flowers from center to circumference.

THE authorities of Eureka are striving to suppress the opium dens of that town, arresting the keepers, all of whom are Chinamen.

IN about a month the wood business in the Sierra will give employment to some 4,000 men getting out wood for the Washoe mines.

THE new pension bill will abolish the present 18 Pension Agencies, effecting a saving to the Government of about \$200,000 annually.

CALIFORNIA is now producing 200 barrels of petroleum, worth \$800, daily. Well No. 4, in the Fico district, yields 66 barrels a day.

THE workmen, at a late meeting in Virginia City, tended James G. Fair the nomination for U. S. Senator, which he declined.

A MOVEMENT is started by some colored men in Washington, who are opposed to the Liberia scheme, to colonize their race in the West.

CAPT. BOYNTON has accomplished the feat of swimming across the Straits of Gibraltar.

THERE is a strong probability of Emery, present Governor of Utah, being removed and his place being filled by Gen. P. E. Connor.

IT was the belief of the distinguished French statesman, M. Guizot, that Constantinople would become the capital of a Greek empire.

THE House Committee on Coinage, Weights and Measures, have agreed to report Maish's bill punishing defacers of gold and silver coin.

TWENTY western railroads, during the month of January, 1878, earned \$6,085,162, an increase over the corresponding month of 1877 of \$863,497.

THE gradual decline in the price of gold renders possible the indefinite postponement by the Senate of the bill to repeal the Resumption Act.

THE ports of Nicaragua are to be blockaded by German war vessels until certain reasonable demands made by Bismarck have been complied with.

THERE are now steam engines of 1,500,000 horse-power, representing the actual labor of 4,500,000 horses, or 31,590,000 men, in use in France.

OFFICIAL statistics gives the cost of the late war with the Sioux at \$2,312,531, and the whole number of persons killed, 16 officers and 267 enlisted men.

A PASSENGER train on the Central road, New Jersey, struck a woman and two children near Roselle, and killed all of them instantly, while walking on the track.

A PLAN of heating a multitude of houses by steam from a common boiler has been tried for months in Lockport, New York, and the result is a complete success.

LOOK out for counterfeit trade dollars. They are smaller than the genuine coins, and the metal has a yellowish tinge, but they are well calculated to deceive.

ALL boilers required by the government will hereafter be constructed at the Mare Island navy yard; a rolling mill is to be provided for making the boiler iron.

MRS. ABRAHAM LINCOLN is reported to be living in seclusion in France, fearing to return to the United States lest she should again be placed in a lunatic asylum.

THERE was employed, last Monday, 123 dollar a day men at the park. They are constructing a new drive on the southern side to connect with the main road to the beach.

ON the 24th inst., over 300 persons were drowned by the capsizing of the English training ship, *Eurydice*, off the Isle of Wight. Only one boy and a seaman escaped.

DIRECTOR LINDERMAN favors making trade dollars because a definite demand has been created for them in the East, and an outlet is thus provided for large silver export.

LEADING New York bankers are of the opinion that resumption would be practicable at the date now fixed if Congress would put a stop to the agitation about the currency.

THE death of Judge Leonard, in Cuba, will be investigated, rumors being afloat that he was poisoned by the Cubans, on account of a love affair that took him to that country.

THE House Committee on Commerce have agreed to insert in the River and Harbor Appropriation bill an item of \$80,000 for continuing the improvement of Oakland harbor.

At the International walking match just terminated in London, O'Leary walked 520 miles in five days 20 hours and 10 minutes, beating his competitor, Vanghn, who made 500 miles.

THE Supreme Court of Nebraska has decided that dealing in grain options in Chicago is gambling, and all contracts made in that State founded thereon are against public policy and void.

THE boiler of the steamer *Magnita*, which was racing on the Hudson the other day, exploded, killing two of the passengers, scalding two others severely and blowing a boy overboard.

ALL real estate men agree that a return to the six and a quarter cents fare on the street railroads would tend greatly to depreciate the price of property in the suburban districts of this city.

THE five republics of Central America are likely to be involved in another general squabble in the effort to reconstruct a Confederation, which measure Costa Rica advocates and Guatemala opposes.

THE Chinese Ambassador to England attributes the famine in India to so much land being devoted to the cultivation of the poppy, 1,033,000 acres of the best land in India being devoted to that business.

At the Paris Exhibition there will be distributed 1,000 gold, 4,000 silver, and 8,000 bronze medals; it is also intended to award 8,000 honorable mentions, besides 100 grand prizes and exceptional silver prizes.

THE national debt was, on the 1st of March, 1869, \$2,525,463,000. March 1st, 1877, the debt amounted to \$2,088,781,000. The decrease had been \$436,682,000 in eight years, and the average yearly reduction has been \$54,585,000.

JOHN RUNK, who was sentenced to be hung for the murder of officer Coots, has been reprieved until April 19th, by Governor Irwin, that he may have time to more carefully examine into his case after the Legislature adjourns.

THE wife of A. Lognoze, boarding-house keeper, swallowed a teaspoonful of strychnine at Ophir canyon, near Austin, Nevada, on the 21st, and died three hours afterwards. Deceased had been subject to aberration of mind for several years past.

Free Libraries and Reading Rooms.

We are indebted to Senator Gee. H. Rogers, of the State Senate, for a copy of his important bill, which has been approved by the Governor, as follows:

An Act to Establish and Maintain Free Public Libraries and Reading Rooms.

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Board of Supervisors of the city and county of San Francisco, and the municipal authorities of the several incorporated cities and towns of this State, are authorized to levy and collect, as in other cases, annually, a tax, not to exceed one mill on the dollar, for the purpose of establishing in such cities and towns, respectively, free public libraries and reading rooms, and purchasing or leasing such real and personal property, books, journals, and other publications, and erecting such buildings as may be necessary therefor.

SEC. 2. The municipal authorities, respectively (except as is hereinafter otherwise provided), in their respective cities and towns, may appoint such trustees (not exceeding seven), and such other officers and assistants as may be necessary to carry into effect the provisions of this Act; they may declare and fix the terms of office (not exceeding four years) of all such trustees, officers, and assistants, and, at their pleasure, on the request of a majority of the trustees, may remove any from office, and fill vacancies; they may fix the salaries of all officers and assistants, except the trustees, who shall serve without salary or other compensation; and they may make, or may authorize the trustees to make such rules and regulations and by-laws as may be necessary for the government and protection of such libraries and reading rooms, and all property belonging thereto, or that may be loaned, devised, bequeathed, or donated to the same.

SEC. 3. All money and revenue collected or received by authority of anything herein contained shall be known and designated as the "Library Fund," and shall be paid into the proper city or town treasury, and there kept separate and apart from other funds, and be drawn therefrom as in other cases provided, but only to be used and applied for the purposes herein authorized.

SEC. 4. All property, real and personal, acquired by purchase, gift, devise, bequest, or otherwise, under the provisions of, or for the purpose authorized by this Act, shall vest, and be, and remain in the proper city or town, respectively, and may be protected, defended, and sued for, by action at law or otherwise, by such cities and towns, respectively, as in other cases.

SEC. 5. The following 11 persons, to wit: John S. Hager, Geo. H. Rogers, Irving M. Scott, Robert J. Tobin, E. D. Sawyer, John H. Wise, Andrew J. Meulder, Louis Sless, A. S. Hallidie, C. C. Terrell, Henry George, and their successors, are hereby constituted and appointed, during good behavior, honorary trustees, without salary, of any library and reading room, and of the real and personal property thereunto belonging, that may be established or acquired under the provisions of this Act, in and for the city and county of San Francisco. Such trustees shall meet for business purposes on the first Tuesday of each month, and at such other times as they may appoint, in a place to be provided for the purpose, and six shall constitute a quorum for business. They may appoint one of their number President, and they may also elect a Secretary, who shall keep a record and full minutes, in writing, of all their proceedings. The Secretary may certify to such proceedings, or any part or portion thereof, under his hand, verified by a seal, to be adopted and provided by the trustees for that purpose. Such trustees, by a majority vote of all their members, to be recorded in the minutes, with the ayes and noes, at length, shall have power

First—To make and enforce all rules, regulations, and by-laws necessary for the administration, government, and protection of such library, reading-room, and property.

Second—To fill all vacancies that may, from any cause, occur in the Board of Trustees.

Third—To remove any trustee who may neglect to attend the meetings of the Board, or who may absent himself from such meetings, or, without the consent of the Board, from the State for three consecutive months.

Fourth—To appoint and define the powers and duties of any and all authorized officers and assistants, and, at their pleasure, remove the same.

Fifth—To provide memorial tablets and niches to perpetuate the memories of those persons who may make valuable donations to any such library.

Sixth—By and with the consent and approval of the Board of Supervisors of said city and county, expressed by resolution, duly passed by that body: To determine the number of officers and assistants to be appointed for such library and reading room, and to fix the salaries of such officers and assistants, and of the Secretary; to purchase necessary real and personal property; to lease and erect buildings; to order the drawing and payment of money from out of the Library Fund for any expenditure or liability herein authorized, and generally to do all that may be necessary to fully carry into effect the provisions of this Act.

SEC. 6. The Board of Supervisors of the city and county of San Francisco, are author-

ized and empowered, by a resolution duly passed for that purpose, to grant, donate, or authorize the use of, either in whole or in part, any land, square, or other real estate belonging to said city and county, or dedicated to public use therein, for the purpose of erecting and maintaining thereon a building to be used only for a public library and reading-room, in and for said city and county, as in this Act authorized and provided.

SEC. 7. The proprietors, or other competent authority, of any subscription or other library may, upon such terms and conditions as shall be agreed upon by them and the municipal authorities of any incorporated city or town, except in the city and county of San Francisco, donate and transfer its property, real and personal, to any such city or town, for the purpose of establishing and maintaining a public library and reading-room within the meaning of this Act; and as a condition, and in consideration of any such donation, such proprietors may, at their option, nominate and appoint as honorary trustees, without salary, a number equal to those appointed, or authorized to be appointed, by such municipal authorities, respectively, as in this Act provided. Such honorary trustees, by a majority vote, may fill all vacancies that may occur in their number, and they, respectively, shall have an equal voice with the other trustees in the direction, management, and control of such libraries after such donation and transfer shall be made and accepted.

SEC. 8. This Act shall take effect immediately.

Piety Hill Mines, Shasta County.

A correspondent of the *Visalia Delta* writes from this locality as follows: "The contrast between the weather of your place, at the time of my visit in December, and that which we are enduring here at the present, is most striking. Up to March 1st, the rainfall at Shasta, for the season, was 72.53 inches, and for February, 27.25 inches, and still it comes, while there appears to be nothing to prevent its continuance for a month to come. Considerable stock has already perished from exposure to the protracted storms; but gravel miners are being largely benefited, and an abundant yield of gold can confidently be predicted for this season.

The Piety Hill blue gravel mining company are working an extensive gravel deposit here. The gold and silver bearing quartz ledges of this district (south fork of Clear creek) are not being worked to any extent at present, as the ercs are not readily reduced. The ere of the Chicago mine was worked by milling process for several years, but new contains too much lead for milling, and insufficient for smelting. A process of lixiviation is meeting with better success.

The gulches and ravines below here were washed out years ago, but John Chinaman still manages to make money by reworking the tailings. There is some good land, both for stock-raising and grain, in this vicinity, while the certainty of crops on land in the valley is proverbial. Our nearest railroad point is Andersen station, 16 miles from Igo, and about 18 from these mines. Good roads are the rule, but this kind of weather lets the bottom out of most of them. The *Shasta Courier* is the leading paper of the county. The most interesting occurrence for us, in this community, would be a little clear weather. Fifty-three rainy days, without counting the nights, is enough to make rainy weather monotonous.

NARROW-GAUGE RAILROADS FOR MINING.—Railways for mining and manufacturing purposes, of very narrow gauge, are becoming quite common in Great Britain. Several miniature locomotives have been constructed for a road of 19 inches gauge in the lead mines of the Great Laxey mining company. They are about two feet three inches in width, and a little over four feet from the rails to the top of the chimney; the cylinders are placed inside, and are four inches in diameter, and six inches stroke. The wheels are 10 inches in diameter, of cast steel, and the engine is carried on two wrought iron frames extending the whole length. It is fitted with link motion, feed pump, injector, brake gear, etc. The water is carried in a tank between the frame plates. Each of these little machines will draw on a level from 13 to 15 tons at a speed of about eight miles per hour. It is, however, quite certain that for all general purposes, whether of business or public use, narrowness of gauge is rather a disadvantage. The best plan is to build a light road of standard width, which is altogether the most convenient, at the same time there is no perceptible difference in cost.

NEW STYLE OF CEMENT MILL.—A correspondent of the *Dutch Flat Forum*, writing from Iowa Hill, Placer county, says: We have here two mills for crushing cement, one situated at Roach Hill and one at Wisconsin Hill. The latter is something entirely new in its application to mining, and bids fair to work a complete revolution upon the old system of cement crushing. It consists of a hollow cylinder 40 or 50 feet long, and five or six feet in diameter, formed of iron staves or rails similar to railroad iron, with the flanges upon the inner side. This cylinder is placed in an inclined position, and revolved as fast as necessary by the agency of steam. The cement is dumped into one end and the rocks come out smooth and polished at the other, leaving the pulverized dirt and gold to fall through the interstices of the rails. From a partial trial of its powers the inventors claim a capacity to crush a ton per minute, which is good enough for rich cement.

The Black Hills.

Concerning the locality and condition of things in this country, the *Black Hills Times* discourses as follows: Deadwood, the principal and most northerly camp in the mining region, is distant 200 miles north of the Union Pacific railroad. It is located eight miles from the foothills, at the confluence of Deadwood and Whitehead creeks. The gulch proper contains a population of about 4,000 people. The city, for a mining camp, is substantially built, and is daily improving. Business of all kinds is well represented, and society will favorably compare with any mining town in the West. We have two churches, school houses, two daily papers, telegraph, two daily mails, excellent hotels, and business houses of all kinds. We have no municipal government at present, but steps have been taken for the establishment of a corporate city. At present we are under the exclusive dominion of county officials. The mining interests of Deadwood city are exclusively placer, and are of the richest quality; but recent quartz discoveries upon Spruce gulch, two miles south, and Elk creek, 20 miles southeast, with the already famous silver district known as the Bear Buttes, and the gold region of Strawberry gulch upon the north and east, renders the city a direct central point. Four miles west lies the wonderful cement belt, upon which are located the most thoroughly developed gold quartz mines in the Hills. Central City, South Bend and Gayville, on Deadwood, and Lead City on Gold run, are the other principal camps in this section. Their interests are chiefly quartz mining and milling, albeit their placer claims have yielded handsomely for two seasons. In the districts named there are at present upward of 40 mills, or 600 stamps in constant operation day and night, a number that is being daily increased. The ere pays from the surface down, and at an average of about \$12 per ton, and as it can be mined and milled for one-half that sum, the profits may easily be computed. Land is far from all being taken up, locations being made every hour in the day, besides which valuable property can be purchased at reasonable rates, owing to the inability of many poor miners to work it.

The Bear Buttes silver district is distant about 10 miles, and is equal in richness to any in the world. One smelter is in operation, and others will shortly be erected.

Rapid City, 45 miles southeast of Deadwood, on the Sidney stage route, is delightfully located in a picturesque valley, and has, in addition to large mineral interests, agricultural resources of the very best. Twenty-five miles further south are camps Hayward and Reckerville, in the center of newly discovered, very extensive, and very rich quartz, gulch, and dry mining districts, where there is abundance of room for thousands of locations, which will undoubtedly be made during the coming season. Still further south lies French creek, Custer City, and a large mineral district—the southern extremity of the belt—which is idle at present, owing to the fact that claims elsewhere can be worked more cheaply. In a year or so French creek will be developed, and we predict that when that time arrives the result will astonish "the oldest inhabitant." The climate of the Hills is very salubrious, and the health of our cosmopolitan population is very good. The expense of living here, is, all things considered, very reasonable. Hotel rates are \$3 and \$3.50 per day, or \$18 per week; but as all save transient people sleep in their places of business, and merely pay \$10 per week for table board, individual expense accounts are very light.

TIMBER AND DESERT LANDS.—A bill has been introduced in Congress providing that the limits of such sections of country in which agriculture cannot be carried on successfully without irrigation, shall be defined by the Secretary of the Interior. In these sections of country surveyors are to show on maps the limits of the timber tracts, which the Commissioner of the General Land Office shall divide into three classes: Timber covering mineral lands; timber covering mineral lands where mineral is of less value than lumber, to be known as timber-mineral lands; and timber lands. Timber upon the first named will be sold by the Government on the stump in parts of less than 40 acres, at a price not less than appraised by the surveyors. The Legislatures in the States and Territories will decide what proportion of other classes can be cut without injury to agriculture, and the Land Office will make sales to this amount. The remainder will be held by the Government and protected from depredation. Timber thus sold must be removed from the land in five years. Settlers on unsurveyed lands are permitted to use Government timber to meet personal needs. All timber lands on surveyed lands are exempted from pre-emption.

ZINC POWDER.—The zinc powder of commerce, which is now considerably used in the arts, is said to be composed of zinc 40 parts; lead, 2.5; cadmium, 4; zinc oxide, 50; zinc carbonate, 2.5, with some traces of non-metallic dust. As a part of the cargo of vessels it is extremely dangerous and ought never to be stowed where it cannot be readily removed. When it is slightly moistened with water it becomes spontaneously inflammable.

Mining Districts in Southwestern Nevada.

The Belleville *Times* of recent date contains the following account of various mines, mining camps and districts, the most of the latter formed many years ago, and all lying off in the southwestern part of the State of Nevada.

The town of Candelaria, lying eight miles east of Belleville, has a population of about 200. The principal mines here are the Northern Belle, Victor, Petesi and Richards, there being hundreds of others on which a large amount of work has been done, but the owners are too poor to open them. A custom mill is needed, and a mill with small means could put up a 20-stamp mill and gain a handsome income. The eres in that section assay all the way from \$32 to \$530, the average being from \$100 to \$125 per ton in silver. Rhodes & Wasen are negotiating for a mill which they intend putting up at the Victor mine, the ore from which will average \$125 per ton as it is thrown in the dump. Summit springs, from which it is proposed to bring the water to Candelaria, is about 12 miles north of the town, the water supply being sufficient for all demands. There is as much ere in Candelaria hill as any other section of the State, but miners of small means can do little towards developing a claim, however rich; a custom mill would be a great benefit to them, besides a good thing for the owner. Although they have not been shipping such large quantities of bullion from the Northern Belle for three months as in former times, yet from the best information at hand we are of the opinion that in a few weeks her bullion shipments will be largely in excess of anything before known.

Columbus, once a very thrifty place on account of its herax interests and two mills for the reduction of ore, is not quite so lively now, but it will without doubt be heard from again ere long. It is nearly east about 15 miles from Belleville and seven from Candelaria.

Silver Peak is a lively little camp, 60 miles east from Belleville and in the same county. At last accounts there were about 100 men in that section, but probably more now, as they have two new Bruckner furnaces ready to start up in addition to the mill, which has been running for some time. Many persons who have visited this camp say they have rich mines.

Northwest from Belleville, 20 miles, is the comparatively new district of Silver Star, where the town of New Boston is building up rapidly. The principal mines are the Boston, Rhodes, Silver Queen, Murphy and IXL, besides several other rich claims. The Wasen company are putting up a fine 15-stamp mill near New Boston. There are hundreds of locations here, many of which assay well in gold. This is one of the most promising districts in the State, and ere rich mines will hold its own with any mineral-bearing belt we know of. Probably 125 men are at work in this district.

Next, also northwest, and about 35 miles distant from Belleville, is Santa Fe, formerly Volcano; though an old district, very little work has been done for several years and the majority of the claims now being worked were recently relocated. From the old Volcano mine a great deal of ore was shipped to Sacramento, which netted \$250 per ton, but the company, probably from mismanagement, finally ceased operations. The Sunrise and Gladden are both being worked at present. On the former there are about 20 men at work, who recently uncovered a fine body of ore. There are other locations in this section which assay well.

Black Mountain district, seven miles west of Belleville, has been the scene of a great deal of prospecting, and some valuable locations have been made here. Among them the Endowment, Black Hawk, Combination, Greyhound, Belle Union, Emma Lake, Defiance and a great many others. The Endowment company have the Centennial five-stamp mill at Marietta, which is running day and night. The population of the town is nearly 150 and on the increase.

The Gregg Leaching Process.

The *Mining Record* thus describes the new leaching process, recently put into successful operation upon the low grade ores at Bingham, Utah: The leaching is carried on in a wooden tank, the ore having been previously crushed and passed through a No. 30 screen. The tank being filled with this prepared ore, the liquor is poured on for two hours, then drawn off into what is termed the precipitating tanks. Into the latter, when full, a chemical substance is thrown, which precipitates the silver as a black sulphide. This is collected in flannel sacks; other chemical matter is then added to carry off base substances, when the contents are strained and dried in an oven. Subsequently they are passed into a roaster and converted into a matte, when it is ready for the crucible. Some 8,000 ounces of silver have already been produced by this process. All the lead in the ore is lost, but it is claimed that 95% of the silver is saved. The ore treated contained 18 ounces per ton of silver per assay, and 6% lead. The originator of the process is a Mr. Gregg, who, associated with Messrs. Cushing & Gamble, of Utah, has works at Bingham, of the capacity of 75 tons per day. The cost of operation by this process, after the ore reaches the works, is but \$3 per ton. Our contemporary evidently regards the efficiency of this process as a fixed fact.

Mining for the Precious Metals.

The Gold Hill News, in defending the business of gold and silver mining from the aspersions cast upon and the many objections urged against it, while admitting that in many instances it has been attended with failure, sums up the benefits conferred by it upon the various classes, industries and occupations, as follows: Apart from the general advantage arising from these metals for purposes of coinage, this branch of mining affords employment to thousands of persons at liberal wages in almost every capacity. In the first place, there are the miners who sink the shafts, run drifts, sink winzes and run crosscuts and mine the ore; the machinists, engineers, blacksmiths, carpenters, millwrights, carmen, superintendents, foremen, shift bosses, time and storekeepers, civil engineers, teamsters with their 10-horse teams, delivering ore, machinery, lumber, wood, charcoal and castings. Then there are the men who chop the wood in the mountains, send it down the flumes and rivers and take it out of the river and load it on the cars; men to chop down trees for lumber, teams that haul wood to the flumes and river, also logs to the sawmills, and boards, plank and timber from the mill when sawed; the men employed in and about the mills, such as sawyers, engineers, logmen and those who handle the lumber after being sawed; machinists and carpenters who erect the buildings and put up the machinery, overseers and bosses, boarding-house keepers, cooks, waiters and laundrymen, builders of wagons, hay and grain consumed by the horses and cattle; blacksmiths to shoe horses, repair wagons and tools; charcoal burners, who furnish coal for the smiths' shops in the mountains; an immense amount of freight furnished to the railroads in the shape of ore and supplies, requiring a host of employees to receive and discharge the same; carpenters and millwrights in erecting reduction works and machinists in putting up engines, boilers, batteries, pans and shafting. Then there is the employment given to the builders of engines, boilers and castings made at our foundries, also pipes, shafting and belting made at the appropriate establishments; numerous boarding-house keepers, with their cooks and waiters, for victualing and lodging the employees at the mines, mills and various works where supplies are manufactured; the money paid for hardware and to the men employed at the tin shops, making air-pipes and many other things required. There are the picks, shovels, hammers, gads, sledges and drills used, which furnish employment to a great many men to manufacture. Then there are the manufacturers of powder, fuse, candles, oil paints, wire and hemp rope to be patronized largely. A large amount of money is paid out by this immense host of employees for living, clothing, tobacco, whiskey and liberal contributions to the support of the tiger, as well as churches, theaters and schools. The donations to the African heast go to support quite a numerous class of individuals. Doctors and lawyers come in for their share of the money put in circulation by the mines; also the wives and children of employees have their support; so do the assayers, refiners and coiners, judges, juries, sheriffs, constables, policemen and jailors get their quota; the printers for advertising meetings of stockholders, assessments levied, dividends declared and delinquent stocks for sale. To the above should be added the supplies of quicksilver, sulphate of copper, salt, acid and ice, giving employment to many to produce them.

Our Expensive Habits.

A shrewd business man explains in the *Territorial Enterprise* the causes of the present hard times on this coast, as follows: Our people do not know the first principle of economy. We are the most extravagant nation on the earth. In San Francisco there are some hundreds of people being fed by public charity. In the same city there is thrown away food enough, daily, from the hotels to feed these people better than royal families are fed in Germany. Here on the Comstock are hundreds of young men working for \$4 per day. They will not see that they are peculiarly blessed; they will not say to themselves: "I can live nicely on \$1.50 per day, and if I save \$2.50 a day, in a year I shall have \$750, with which I can buy a quarter section of land, a team, seed and a year's food, and in five years be independent in my own home." Not at all. They will have at least one suit of clothes better than a wealthy New England man wears every day; once or twice a week they will go to the theater; they will not think of smoking anything less than two-hit cigars, and the result is they are at the end of December just where they were on the first day of January preceding, except that they are a year older. And this is characteristic of us all. Mingled with this extravagance is a false pride, which causes men and women to try to keep up an appearance before the world which their incomes do not justify. This is probably the cause of more heart-aches than any other one thing in the United States, and it is persisted in year after year when it is apparent that it is like dyeing one's whiskers; it deceives no one but the person practicing it. We shall do better after we have suffered enough. No doubt the Chinese were fast liver when they were few in number and the resources of their country were ample. What we see of them is but the result of 3,000 years of want—a drift which is hereditary. In less degree the same thing is apparent in all old nations.

Useful Information.

GROWTH AND WATER.—At the Royal Institution in London, Prof. Dewar recently gave an account of the latest important observations on the transpiration and movements of water in plants. Marie-Davy, two years ago, worked out the calculations of experiments, which show that for the production of 16 grains of corn as much as three and a half pounds of water are transpired. M. Risler has found that a field of growing wheat transpires between April and July as much water as would cover the surface of the ground to a depth of nine inches. These experiments have obviously direct practical bearings on agriculture. This influence of sunlight on transpiration has been investigated by Prof. M'Nab. Experimenting with the leaves of the bay laurel, he found that in sunlight there was but little difference between the amount of water transpired in an atmosphere saturated with moisture and in a dry atmosphere. This amount per hour in the first case was 25.96% and 20.52% in the second. In the shade, however, the transpiration in a saturated atmosphere was nil, and in a dry atmosphere only 1.69%, showing in a marked degree the great influence of sunlight, and the small influence of dryness or moisture of air. The rate of the ascent of fluids in plants, ascertained by the employment of spectroscopic examination of the diffusion of lithium citrate, as adopted by Bence Jones in studying the fluids of animals, gave a maximum result of 24 inches per hour. Mr. J. B. Lawes has published the result of lengthy experiments, which show that 200 times the weight of organic matter elaborated by a plant passes through it in the form of water during its growth. With regard to the comparative amounts of carbon assimilated by plants and evolved by animals, Prof. Dewar has elaborated tables which show that an acre of the best cultivated land fixes annually about 22 cwt. of carbon, and a healthy man evolves about two cwt. of carbon annually in the form of carbonic acid, so that 11 such persons supply as much as can be economized by an acre of land.

TRACING AN UNDERGROUND STREAM.—There are many cases, in various parts of the world, where the whole or part of a stream suddenly disappears from sight, and, in some instances, the place of its re-appearance is unknown, or, at best, but a matter of conjecture. It is a common experiment, where the waters of a river make a plunge and re-appear at a short distance, to throw chaff into the upper waters, and note its appearance upon the surface of the lower. The *Engineering and Mining Journal* describes a different practice. It having been supposed that a portion of the water of the upper end of the Danube went to feed the river Aach, an affluent of Lake Constance, and some 10 miles distant from the Danube, Professor Knop, of Karlsruhe, improved and greatly beautified this experiment by emptying into the Danube some 15 gallons of fluorescence (a very powerful green coloring material), of which 1-20,000,000th part will impart a perceptible color to water. In about 60 hours the waters of the Aach began to show a marked green color, which continued for a day, and, although the current of the Aach passes 1,500 gallons per second, was so pronounced as to alarm the inhabitants.

GAS FROM WASTE.—The Central railroad of New Jersey has put up near the depot, at Communipaw, a small building to test a new process by which it is claimed that illuminating gas can be cheaply made. The material used is old, oily waste collected along the road and mixed with chips and shavings of hard wood from the shops. The fuel used to heat the retorts is old ties and cinders from ash pits (the company uses anthracite coal exclusively for its engines). The residue left in the retorts after the gas is extracted is very good charcoal from the wood, while the charcoal waste is said to be a good fertilizer. The cost for fuel and materials is certainly very small, and the gas is said to be of a very good quality.

AN INSECT IN A CITADEL.—Dr. Dewitz, a German naturalist, has recently described a very remarkable case of insect instinct peculiar to a butterfly of the genus *Aidos*, indigenous to Venezuela. The chrysalis on casual examination seems to be perfectly empty, while its surface is punctured with numerous holes. Closer scrutiny shows that, in reality, there is a double envelope, the outer layer alone of which is perforated, while on the inner covering are deep pits corresponding with the apertures. The caterpillar, after making the outer cocoon, perforates it, and then makes a strong inner one, in which it takes refuge, the object of the holes being obviously to cause the cocoon to appear untenanted.

HEAT IN BUILDING MATERIALS.—Some recent investigations concerning the coefficient of conduction for heat of various building materials—excluding the influence of radiation, and making measurements by means of the thermo-electric multiplier—show that stones are much better conductors of heat when wet than when dry, and that various classes of them, such as marble, sandstone, granite, etc., have approximately the same coefficients of conduction, while bricks of all kinds are much worse conductors than the natural stones. These facts have an important bearing, certainly, not only upon the construction of buildings, but upon the methods of management in case of fire.

SWINE AND FIELD MICE.—A Posen farmer, writing to the *Landwirth*, insists upon the great value of swine as exterminators of field mice and other vermin. He believes that the terrible plagues of mice now so prevalent in many parts of Germany are in great measure due to the present system of keeping swine penned up, instead of allowing them the range of the fields as was formerly the custom. He states that a careful observer may often detect pigs in the act of snapping up and devouring a good-sized mouse, besides which they have an extraordinary keen scent for the nests, grubbing them up most artistically in search of the young mice, which they eagerly devour *in situ*. In fields that have been cropped with lupines or oats the swine, when turned in, invariably select the spots where the ricks have stood to grub in, not, as might be thought, in search of stray grain that may lie there, but because these particular places are swarming with mice nests.

EXPLORATIONS IN THE INDIAN NORTHWEST.—The recent explorations on the northwestern frontier of India have added largely to our geographical knowledge, and have supplied us with a complete survey of that hitherto unexplored portion of the river Indus which stretches for a distance of upwards of 180 miles from Bunji in Little Tibet, to Amb, on the confines of Haxara. Besides this important piece of work, we have the course of the Kohistan or Panjkora river laid down for the first time, from its source as far as Dir, and other routes south of the Baroghil Pass. We understand that the War Office purposes bringing out a map of the northwest frontier of India which shall employ these as well as all other recent explorations in that quarter.

IMPROVED METHOD OF MANAGING STEAM-BOILER FIRES.—When the furnace-door of a steam boiler is opened, there should be a simultaneous partial closing of the damper to prevent sudden chilling of the boiler and flues. To accomplish this, with certainty, for every opening of the doors, Mr. Wm. Weightman, of Powers & Weightman, has arranged and applied a system of levers and rods, connecting the furnace-door with the damper, so contrived that whether there be one or more doors to one furnace, or to which one damper is supplied, the act of opening any one door will invariably close the damper. Whether this application of simple and ingenious devices is new, or not, every engineer, says the *Journal of the Franklin Institute*, will regard it as one of the good things for aiding the better management of steam-boilers.

Good Health.

Hints on Finger Nails.

Hall's Journal of Health gives the following hints on the care of the finger nails: The collections under the nails should not be removed by anything harder than a brush or a soft piece of wood, nor should the nails be scraped with a penknife or other metallic substance, as it destroys the delicacy of their structure, and will at length give them an unnatural thickness. Most persons are familiar with those troublesome bits of skin which loosen at the finger nails; it is caused by the skin adhering to the nail, which, growing outward, drags the skin along with it, stretching it until one end gives way. To prevent this, the skin should be loosened from the nail once a week, not with a knife or scissors, but with something blunt, such as the end of an ivory paper cutter; this is best done after soaking the fingers in warm water, then pushing the skin gently and slowly; the white specks on the nails are made by scraping the nail with a knife at a point where it emerges from the skin.

Biting off the nails is an uncleanly practice. Children may be broken of such a filthy habit by causing them to dip the ends of their fingers several times a day in wormwood hitters, without letting them know the object; if this is not sufficient, cause them to wear caps on each finger until the practice is discontinued.

HAIR TONIC.—A *Tribune* lady says of the hair: No oil or pomades should ever be allowed to clog the pores of the scalp; but if some smoother or glossifier must be applied, take glycerine mixed with some rose water or a little cologne. The following often proves beneficial when the hair falls out or is of weak growth: (Hair tonic) Quinine, ten grains; tincture of cantharides, one drachm; bay rum, two ounces; glycerine, one ounce; rose water, four ounces. Rub into the scalp once a day after thoroughly brushing the same. Ladies would have less trouble with their hair, and complain not so often of headache, if they would allow the same to grow naturally, and not be always drawing it over their heads as if to pull it out by the roots.

EUCALYPTUSINTE.—A new preparation from eucalyptus, under the name of eucalyptusinte, is announced from France. A Dr. Mierdue, a colonial surgeon, has succeeded, after many experiments and much research, in distilling from the leaves a liquor which is at once grateful to the palate, exhilarating, and not only quite harmless but also possessing many useful medicinal properties. This new beverage is, we learn, being largely made and consumed in Marseilles, and it is thought that within a few months it will become as popular as absinthe, and probably to a great extent take its place.

Antidotes to Strychnine.

EDITORS PRESS:—I have just read an item copied into your paper that coffee is an antidote for strychnine poisoning. Like a great many other items of the kind that go the rounds of the press, the remedy seems very nice until you come to test it. Only a few days ago a miserable woman, wishing to rid herself of an incurable disease and a drunken husband at the same time, took a large portion of strychnine in a cup of strong coffee. She died within 20 minutes, and before a physician could reach her.

Perhaps the best immediate remedy would be to empty the stomach with a strong solution of salt and mustard, or sulphate of zinc, after the poison is absorbed, which takes place very rapidly; inhalation of chloroform for the spasms, also a few drops internally, with chloral hydrate. Bromide and iodide of potash are used as antidotes. Sweet oil and other oils taken freely are popular remedies, and possibly do good by preventing the absorption of the strychnine. C. L. A. Santa Cruz, Cal.

Paralysis Caused by Cosmetics.

One cause of acquired deformity is the slow poisoning of the system by certain metallic poisons. Chief among these are the salts of lead, and one of the most characteristic deformities produced is what is commonly known as "wrist-drop," caused by the use of "Bloom of Youth," and other villainous cosmetics. The use of cosmetics has within a few years become very common, even among the better class of society, and as most, if not all of them, are as dangerous to use as the particular one described in this report, I have deemed it my duty to place these cases before the profession, that, knowing their injurious effects, they may guard their patients against thus voluntarily poisoning themselves through ignorance.

This deformity, incompletely developed, can be seen every day upon the streets of this city, for there is many a fashionable lady who suffers from it in consequence of her own folly. Her hands are held in a peculiar, yet fashionable position, a sort of kangaroo style, and many fancy that they are imitating the fashion admirably, while they are simply obliged to carry their hands in this position because the extensor muscles are not strong enough to hold them up. The polish they put on their faces has manifested itself in producing partial paralysis of the extensor muscles of the fore-arm, and the fashion has been introduced to accommodate the deformity.—Dr. Carbally.

TO GET MOIST AIR.—An effective contrivance, says the *National Car-Builders*, has been devised for overcoming the dryness of air in heated rooms. It is called an "air-moistener," and is of additional service by arresting the dust that comes up through hot air-flues. The device consists of a series of pans set in a frame. Each pan has an outlet tube which rises from the bottom to a height less than that of the sides of the pan. Consequently, water poured into the top pan overflows through the outlet tube and fills the pan below it, and so on through the series. At the top of the frame there is a chamber of just sufficient capacity to hold water enough to fill all the pans. This is filled first, then its outlet valve is opened, the pans fill and the contrivance is ready for operation. The frame is to be hooked on in front of hot-air registers or set on top of a stove or furnace. Air thus moistened is very pleasant to breathe and must doubtless prove far less irritating to the lungs and throat than ordinary furnace-heated air. The quantity of water evaporated is large and the apparatus needs to be filled at least once a day. But, where it is inserted in cellar-furnaces, the filling can be made automatic by connection with the water supply.

SALTED MEAT.—1. Salt extracts a considerable portion of the juices of flesh. It also hardens it. 2. The flavor is far inferior. 3. It carries far too much salt into the system. Much of the impaired health farmers have in spring comes from this source. This excess of salt with the meat begets thirst, loss of appetite, impaired digestion and skin disease. It would be far better for them to eat no meat in winter, but substitute oatmeal, molasses, cream and fruit for salted flesh, than to eat so much of the latter. With this diet they would rarely have the debility in spring now so common.—Dr. Holbrook.

ANTI-ASTHMATIC CIGARETTES.—Equal parts of belladonna stramonium, digitalis and sage leaves are made into a decoction with two hundred parts of water. Eight parts of tincture hen-zoin and fifteen parts of niter are then added, and hihulous paper is soaked to the mixture twenty-four hours and then dried. This paper is to be cut into slips three and one-quarter inches long by two and one-half inches wide, which are to be rolled into cigarettes.

GUNPOWDER MARKS.—Says the *London Lancet*: Smear the scorched place with glycerine, by means of a feather, then apply cotton wadding; lastly cover with oil silk. In one case the discoloration was very great, the patient looking more like a mummy than a living being. It entirely subsided in a month by the above treatment.



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The Week.

Business, through all its ramifications, shows signs of returning activity and labor is slowly settling into its normal condition once more. Something is being done, and perhaps all that can be under the circumstances, to displace Mongolian by white labor, the Chinese being slowly crowded out of several of our local industries.

The rains, which with each succeeding week throughout the past month, we had thought would bring the wet season to an end, have been continued, contrary to expectation and all precedent. Latterly, however, they have fallen gently, and being attended with a warm atmosphere, vegetation of all kinds has been advanced rapidly. As a result we have almost everywhere a luxuriant growth of grain and grass, the products of the dairy being abundant and cheap beyond example on this coast, and should the threatened war in Europe be averted, our farmers can hardly expect a hospitable market for their cereal crops.

The Schively brothers claim that their new furnace, for working rebellious forces, is a success. If so, the Meadow Lake District will again come into prominence.

GREGO SANCHEZ shot and fatally wounded Joe Wilcox, while they were drinking and quarreling in a saloon at San Juan, on the 23d inst.

TWENTY-FIVE Chinamen have been arrested for riot and attempt to murder at Union island.

Condition of Our Leading Industry.

From all parts of the coast, cheering intelligence reaches us in regard to the mining outlook—the prospects for the various classes of placer workers being especially encouraging. The hydraulic washers have plenty of water for present purposes, with a good show for a prolonged water season, enabling them to carry on operations to a late period in the summer, when they can work to much better advantage than during cold and stormy weather. There is a good body of snow on the mountains and it is said to be well impacted, a condition that has as much to do with extending the water season as the bulk of the snow itself. A number of the leading hydraulic companies so enlarged their mountain reservoirs last fall, as to greatly increase their storage capacity; some also built new receptacles of this kind, so that altogether the additional water supply secured through this means will be very considerable. Despite the almost uninterrupted storms, there has been less freezing weather in the mountains this year than usual, a state of things that has tended further to promote this branch of mining. Already most of the hydraulic companies have made one or more satisfactory clean-ups, several made by some of the large ones having been very heavy. The period has arrived when this class of mines reach their maximum product for the year, and for the next two or three months we may expect these heavy yields will occur with greater frequency.

Another class of placer miners have also been enabled through the superabundant water supply to reap this year an unusual harvest. Hundreds of dry gulches in which water seldom runs, and elevated localities where none can be brought by artificial means, this winter have had plenty of water for washing. As these places are apt to be rich in gold, very good and occasionally large wages have been made here by the parties working them.

The drift miners, who sluice out the gravel accumulated in their dump yards only once or twice during the course of the year, and who sometimes have not even enough water for this, experiencing the present year no deficiency, have nearly all washed up and, so far as we can learn with results that leave them no cause for complaint. This branch of mining is growing in favor, our miners through a long and disastrous experience, having learned how to reach and remove the auriferous contents of these ancient channels with greater certainty and at less expense than aforesaid. A number of enterprises directed to the exploration of this class of deposits have lately been set on foot, all with good chances of making an early success. The sites of these operations range from Placer to Plumas counties, along or near the upper edge of the main gold-bearing belt.

Notwithstanding the indifferent luck attendant on the dredging operations undertaken on Feather river last year, these efforts, it is said, will be renewed the coming summer, either on that or some other stream in that part of the State, the same machine, slightly modified, being employed as before. The plan of tunneling under the river beds that have become the receptacles of large quantities of auriferous tailings, or which are supposed to contain undisturbed gravel rich in gold, is coming every year more into vogue; and, although none of these schemes have yet been fully perfected, several are in progress and will soon reach their objective points. Some new enterprises of this kind have been projected, and will be actively prosecuted the present spring.

In the department of vein mining, much progress is also being made, the quartz lodes of California attracting the attention of small investors more than ever before. While many of our large capitalists are looking away to Arizona and the Black Hills, and other places without the State, the men of small means, and those who desire to make their own experience and muscle tell in the business, are seeking fields for investment and exertion nearer home, and we will venture the assertion with equally as good chances of achieving a final success as those who go farther to look for it.

EDITORIAL ASSOCIATION PROPOSED.—The Butte county Register proposes the organization of an association of California editors and the holding of a meeting in Sacramento in June. The idea is a good one. We often feel that a better acquaintance with our co-workers throughout the State would be of great advantage to us in our work, in addition to the social pleasures to be derived from meeting those whom a fellow feeling should make wondrous kind. The editorial associations in the Eastern States are pleasurable, profitable and satisfactory to all concerned. We hope the project may be realized.

HALL & KELSHAW, of the Sacramento Boiler Works, have removed from their old place, at the corner of Mission and Fremont streets, to Nos. 214 to 218 Beale street, in the rear of the Etna foundry. They have now a much larger establishment and increased facilities for turning out work.

MESSRS. SONNON & Co. have struck graphite, or plumbago of a very pure character, in Tuolumne county, about 20 miles east of Sonora.

AL PECK, the man with a bible name who finds rich ledges with his divining rod, is again prospecting the Comstock.

The Mining Debris Question.

It is gratifying to observe that, with the lapse of time, the extreme views once entertained by the parties adversely interested in the solution of this question are being gradually modified, both being now disposed to pursue the discussion in a spirit of mildness and conciliation. The miners, as a general thing, are willing to admit that the damage done to a considerable number of the farmers has been serious, while the farmers as a body believe that it would be wrong to estop the miners from further operations in view of the great benefits they confer upon the country at large and the heavy expenditures they have been to in purchasing and outfitting their properties. Like the rest of the community, these two classes have come to recognize the fact that the case as it stands is full of doubt, perplexity and hardships; that there are equities on both sides and that the case can be settled, not by each insisting upon what they conceive to be their legal rights, but by each yielding something of these and coming to an understanding on some middle ground, which, while it may require some sacrifices, will at the same time extend a certain amount of relief to both.

It was this considerate feeling pervading the Legislature that defeated the Ostrom and carried through the Haymond bill, which latter no doubt will become a law. By the provisions of the first of these bills it was made a misdemeanor for any person or company to discharge the tailings from a hydraulic mine into the bed of any river in California; a measure that, if enacted into a law, would have stopped most of the hydraulic mines in the State, the river channels affording the only places into which this material can at present be emptied. The time may come when the most of this debris, diverted from the river beds, will be carried in immense flumes over the foothills and the rolling prairies at their base, there to be used for irrigating and enriching the dry and barren soil; much also being conducted upon the tule lands for filling up and reclaiming the same. But, until such time as provision is made for carrying off and utilizing these slums in this manner, they must, if hydraulic mining is suffered to go on, find their way into the channels of the rivers as at present.

Under the Haymond bill, which also contemplates the improvement of our system of irrigation and the protection of river navigation, a State Engineer is provided for, whose duty it shall be to investigate this mining debris question and to propose such measures as to him may seem best adapted to remedy existing evils. The yearly salary of this engineer is fixed at \$6,000, a sum that should secure the services of a first-class man, who, by the time the next Legislature meets, ought to be able to have perfected a proper plan for dealing with these several difficult problems.

Meantime, it will be in order for our farmers, miners, engineers and all others interested in this matter, or who through their professional acquirements or superior opportunities for observation, are best qualified to discuss it intelligently, to set themselves to work and devise ways and means for encompassing the objects of this new commission, an end that we are in duty bound to believe will be accomplished.

To begin with, there is a certain set of facts connected with this business that may be accepted as axioms. It is, for example, out of the question to think of putting an absolute stop to hydraulic mining in this State. It is equally clear that the navigation of our rivers must, to a great extent, be preserved. Having bought their lands of the United States, neither the farmers nor the miners ought to be deprived even of their temporary use without some compensation, and as this is a matter of common interest, both the State and the general Government ought to contribute toward the expense of indemnifying sufferers and providing effectual means for their protection in future.

With such aid and the exercise of forbearance and good sense on the part of our people, we need not despair of being able soon to see our way out of this trouble, in the removal of which the various remedial measures heretofore suggested will, no doubt, each and all, receive due consideration. Indeed, it is quite probable, that in process of time recourse to nearly every one of them will be found expedient. An extended system of leveeing, supplemented, perhaps, by jetties, a great relief canal, the diversion of the tailings by fluming and the Bear river tunnel scheme may all be employed, unless, to be sure, the more comprehensive plan of raising mounds where required and letting the water everywhere have its way, shall be adopted.

Our army costs more per man than any other in the world. That of Russia costs \$183 per man per year; that of Germany \$229. Of all the European countries England is at the most expensive, paying \$487 per man per annum; but the little army of the United States costs \$1,854 for every member of it.

MRS. GAINES has offered to compromise her entire claims to property in New Orleans for \$2,500,000, payable in 10 annual installments. The city is in such an impoverished state that she is receiving no income from the enormous property, her legal rights to which have been established.

The Old Familiar Names.

The residents of Dutch Flat have of late been considering the propriety of changing the name of that town for some other less suggestive of the rude times and the lowly incident that gave it origin. The proposed change does not seem to meet with general approval, and therein we think the inhabitants of the town have shown good sense as well as sound policy. Along at first names were bestowed upon a good many localities in the mining regions of California that certainly required to be changed, some of these being vulgar and outlandish—a few absolutely indecent. In most cases these objectionable names have been superseded by others more euphonic and appropriate, as, for example, Hangtown by Placerville; Gorge-Eye by Hunt's Hill; Mud Springs by El Dorado; Sarahsville (named after a disreputable person), by Bath, etc. A few of these out names still remain, and no one could reasonably object should an effort be made to replace them by something better. Whisky Diggings, Red Dog, Bullskin, Poker Flat, Shirt-tail canyon, and the like, however agreeable to the pioneer ear, or fit at first, might well give way to something more becoming if not so quaint or original.

But why the denizens of Dutch Flat should desire to "shake" the name of their place any more than those of French Corral, Yankee Jims or Spanish Bar, it is difficult to see. The first part of the name cannot be considered a reproach to any people, and the term "Flat" is, of course, understood to apply to the locality and not to the inhabitants. The Germans, it is true, do not recognize the word "Dutch" as exactly expressing their nationality. But where is the race that has better reason to be proud of their history and present standing than the Hollanders or Dutch people proper? They are conceded to be at this moment the most honest and thrifty nation in the world, and that is praise enough. To be called a Dutchman in this corrupt age ought to be regarded as a real compliment. Let our neighbors in the mountains retain then the ancient name of their town and strive to so live that they bring no dishonor upon it.

Let them not be over-sensitive as to how it affects the ear of the stranger. When traced to their origin there appears almost always, as in this instance, a good reason for the names applied to the towns, localities and mining camps of California. At Dutch Flat, an honest Teuton settled at an early day and there cultivated a garden; hence the name. At Hangtown, a number of culprits were executed for their crimes. What took place at Murderer's Bar, Whisky Diggings and Gorge-Eye, it requires no great stretch of the imagination to conceive. Some of these incidents and events were, to be sure, not at all creditable to the people or the times in which they transpired. Still, they were characteristic of the Californian of that day, wherefore there is no need for unseemly haste in erasing from our geographies the names that have served to perpetuate these early scenes and occurrences. How much better to retain these names, though a little rude and offensive to the lackadaisical taste, than to dub every hamlet and four corners, as in central New York, with a classical name or follow the more common practice of calling them after some of our own leading statesmen and public men.

After a time, too, in this matter of names, we come, through custom, to not only tolerate, but even to like such as at first seemed offensive and odd. You bet, through long use, has lost its vulgar significance, and Murderer's Bar, its bloody associations, Bottle Hill and inebriety are no longer synonymous terms, nor does the mention of Jackass gulch necessarily recall the sonorous haying of the ungainly brute whose name it bears. The glamor of a great wealth has thrown a respectable air around Whisky Diggings, and when Shirt-tail canyon shall have yielded up, as it is likely soon to do, its glittering millions, a name already made nearly reputable through its great riches, will sound like the very essence of poetry and be tolerable enough even to ears polite.

The mining districts of California were not settled largely by Puritans, hence we find in their local vocabularies neither Providence, Salem nor other pious names. There were among these first settlers few Moravians or Dunkers, else these regions, like Pennsylvania, might have been able to boast of a Bethlehem and a Nazareth among their pioneer names. As it is, our mountain nomenclature is sadly deficient in Biblical terms; even the phrase "God's Country," applied to a rugged section of Nevada county, having been given it more in a spirit of derision than reverence. But if the mining counties are so badly off in this respect, that portion of the State originally settled by the Spanish contains enough of saintly names to sanctify the entire secular vocabulary elsewhere throughout the State. As for the old familiar names, *et cetera*.

A BAR of iron worth \$5, made into horse shoes, is worth \$10; made into needles it is worth \$355; made into pen knife blades it is worth \$3,284; made into balance springs of watches it is worth \$250,000. Such is the power of industrious labor over raw material.

The STATE of Colorado has yielded in the last five years, hulkion of the precious metals, to the coin value of \$28,104,815—namely \$4,078,000, in 1863; \$5,363,000, in 1874; \$5,430,000, in 1875; \$6,191,907, in 1876; and \$7,050,907, in 1877.

Uncle Sam's Savings Banks.

We are glad to learn from reports from Washington that the proposition for postal savings banks, which we described some weeks ago, bids fair to be approved by Congress and put into speedy operation. It will be a boon to the frugal citizen, who is now squandering what he desires to "lay away for a rainy day," because he is afraid that saving's swindlers will rob him of it if he intrusts it to him. It will be a blessing to that other class of our men of small means, who are carrying a few surplus dollars around in their pockets or locking it up in a strong box, desiring to save, and yet braving highwaymen and house-breakers rather than take the chance of bank-breakers. The epidemic of broken and plundered savings banks has passed over our country from one end to the other, and distrust is general. If now there be anything safe, and anyone that is responsible for depositors' losses, our people must have it. This desirable quality of safety and responsibility does exist. Uncle Sam should be president of our savings institutions. He is paying interest on large sums. He is endorsed by about 50,000,000 people. He should let us loan our small savings to him, and give us all the benefit of being his creditors, instead of receiving his favors for capitalists, native and foreign. It is said that he is inclined to grant us this deserved favor, hence we rejoice. It is true that he cannot afford to pay us as large interest as men who have speculated with and stolen our money heretofore, but he will give us some interest and the sure return of the principal, and that is a good deal in these days.

It is well for the success of the proposed plan of postal savings banks that it does not come to us as an untried experiment. It has been fully and practically approved by the experience of other countries, and everywhere there is but one deduction and that is overwhelmingly in its favor. It is important now to collect the results of experience abroad. Take, for example, Great Britain. The postal savings system in Great Britain was put in operation in 1861, and was called to life by an experience with rascality in corporate savings banks, quite like that we are now experiencing. Great Britain began in 1861 by receiving deposits at 300 post-offices, and on the first day opened accounts with 435 depositors. By the end of the first year the number of receiving post-offices was 2,535 and more than \$8,491,105, including interest accrued, was held safe for the people. At the end of 15 years, that is in 1876, there were 5,488 post-offices receiving deposits, more than 3,000,000 people had open accounts, and the amount of money held for them was \$44,911,750. This enterprise was plainly for the benefit of frugal folk of moderate means, for the average sum held for each depositor was a little over \$11.

There are other points which we may draw from English official reports on the subject, which are very pertinent. A comparison is made between the losses by the old style savings banks and by the postal system. During 13 years the loss through savings incorporations was \$896,400. During 14 years the loss by postal savings system was \$21,935. The contrast is heightened by the fact that in the former case the depositors lost the full amount named, but in the latter they did not lose a farthing, for the government was obliged to pay for the dishonesty of its agents. The proportion of loss by the postal system has been but one and one-half cents to each \$500 deposited, and this loss, which the government had to make good, was but as nothing, for the profits from the postal savings system during the same length of time, 16 years, was more than \$5,000,000.

Nor is the British experience with postal banks alone to be cited. The system has been successfully introduced in Italy, Austria, Canada and New Zealand, and in France, Germany, Belgium and the Netherlands, some of the English ideas have been put in successful practice and the full system will be ere long adopted. The principles upon which it rests are sound, and the plan of putting them into operation gives the people many advantages over the old system of depositing savings. In the first place it is as safe as the Government is enduring. It is convenient. Offices scattered all over the country do away with the expense and trouble to which rural depositors are subject in sending their savings to the cities for deposit. Money deposited in one office may be drawn out at another, so that the depositor, when he wishes to go away from home, need not carry coin or drafts, but can put his bank book in his pocket and draw out his money here and there as he needs it.

The system of postal savings banks, as proposed in this country, has all the advantages which have been demonstrated in the British system and some others. It provides for allowing depositors to turn their funds into national securities when they desire. If the depositor wishes to become a bondholder he can do so as soon as he has saved \$10, as the denominations of the new 3-65% bonds will be made small for this purpose. He can accumulate these small bonds until he reaches \$500 and can then exchange them for a \$500 4% bond, thus gaining increased interest. These rates of interest are much higher than have been given to British depositors, for they have been paid only 2½%.

We believe the making of thousands of our rural and small-moneyed citizens creditors of the Government will have a salutary effect upon the quality of their citizenship. It will lead them to study more closely the financial

condition of the country because they will have a more direct interest in it. It will make them firmer upholders of the credit of the Government and to understand all influences which affect it for good or evil. It will do away with part of the depressing effect of a debt mainly held abroad and will do more to make a national debt a national blessing than it has ever before been shown to be by the most zealous theorists. It will tend to elevate our politics, for each voter, with a deposit in the hands of the Government, be it never so small, will feel a direct interest in guarding the integrity of the Government by sending only honest and upright men to frame laws and regulate expenditures. The whole theory and practices of the postal savings system are such as we earnestly approve, and we trust our citizens, great and small, may soon have the enjoyment of the safety and profit which its introduction promises.

The Cinchona Tree, Leaf and Blossom.

We present in this issue an engraving of a cinchona tree. The tree is of general interest, as the source whence is derived the febrifuge quinine and its allied alkaloids. It has a special interest to Californians, because it is thought by those who have given the subject much attention that Califor-



THE CINCHONA TREE.

nia alone of the United States enjoys a possibility of growing the tree successfully, and thus reaping the profit of contributing to the world's failing supply of a high-priced medicinal substance. We have noted in former issues the fact that the cutting down of the trees in order to gain their bark, as has been the practice in those countries where it is indigenous, has reduced the supply and multiplied its market price. We have also mentioned the successful efforts made by the English and Dutch governments in the introduction of cinchona plants in Ceylon and Java, and the more or less successful experiments in Brazil, Algeria, and some of the islands of the seas. We have also referred to the tree, especially in its relation to our own State, and cited the opinion of the well-known horticulturist, William Saunders, in favor of San Diego as better fitted than any other part of the United States for successful experiments in quinine production. In addition to these facts, the announcement has been made that Sir William Robinson, senior member of the Council of Madras Presidency, intends to visit his sons in this State, some time during the present summer, and will bring some cinchona plants with him. The experiments about to be made with these plants gives the subject a present interest. The tree is peculiarly sensitive to meteorological influences. It will not stand great heat, nor will it endure even a touch of frost. Our coming guests must therefore be more kindly treated than those which have heretofore died on our hands, and a resting place for them must be most carefully chosen.

Cinchona, Peruvian, or Jesuit's bark is the

dried bark of many species of the genus cinchona, a tree belonging to the order rubiaceae and sub-order cinchonaceae. The species which we have chosen for illustration is the *Cinchona succirubra*, which is pronounced by Dr. J. E. Howard, the leading English authority on the cinchona, as the most robust in growth, and therefore most likely to succeed in new habitats. The tree, as shown in our engraving on this page, grows to a great height. The bark has a silvery luster on the outside. The foliage is evergreen, and the tree is one of majesty and beauty. The leaves, are laurel-like, entire and opposite. The blossoms are white, with rose and purple tints, and an odor similar to that of the lilac.

We have said that the South American practice of felling the tree to obtain the bark had an effect upon the supply, like that of killing the goose with golden egg proclivities. It has been found in the experience of cultivators of the cinchona, that such practice is unnecessary. They discovered that the yield of some species of the cinchona in alkaloids may be much increased by covering the bark with moss, and also that a longitudinal strip of bark may each year be taken from a tree without destroying it; the decorticated portion renewing, if "mossed," its former covering, at least as rich in alkaloids as before.

Of the products of the cinchona tree, it may be said that the medicinal value of its bark depends upon the alkaloids which it contains.

been content to stop and explore many of the lodes passed by without notice or located and afterwards abandoned, but which, under well-directed and patient labor, would have brought them ample remuneration. Being always in search of another Comstock and never finding it, has kept our miners always on the tramp and always poor.

Had gold and silver mining grown up here as it has been forced to do in most other countries, from small beginnings, it would now be further advanced and be in every way on a better footing than it is at present. Under the changes that have taken place, we have been compelled to the observance of greater industry and economy, a lesson that one might as well have learned from the first. The time and effort that it has cost us to get rid of our extravagant notions, and correct the errors growing out of them would have sufficed to place this business on a permanent and paying basis and to perfect us in its management long ago. The sooner we forget the flush times, with their illusions and follies, and learn to be content with a moderate return for money invested and labor performed, the sooner we will find ourselves in harmony with the inevitable and traveling the highroad to success.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

SCREEN.—James. H. Cavanagh, S. F. The object of this invention is to provide a sieve or screen for separators, which will carry the straw and allow the grain to pass through between the slats without the possibility of the straw lodging and choking the screen. The invention consists in the employment of parallel slats or strips, which extend lengthwise of the screen-frame in a line with the travel of the straw. The screen is constructed without any cross-bars or other intervening obstruction for the straw to lodge against. The slats are placed edgewise in the frame and their upper edges are provided with teeth. An end shake is imparted to the screen, and, as the straw passes up the screen, the falling and receding motion causes the teeth to pass under the straw and take a new hold, so that on the next motion it is carried further up the screen. This shakes the grains from the straw and carries the straw off.

STOCK COUNTER.—P. Lytleton, Austin, Nevada. This device for counting stock consists in a gate or door, so connected with a registering wheel that each and every animal in passing through the gate will be counted, and the count recorded on a dial which receives the count from the wheel. The gate partially fills an opening which is just wide enough to allow the class of animals being counted to pass through, so that each animal in passing opens the gate to its full width and operates the register.

GAS PRODUCING COMPOUND.—Louis Marks, S. F. This is an improved gas producing compound or composition to be used in the manufacture of illuminating gas. It consists in combining certain ingredients into a block or corporate body, which can be conveniently hauled and transported from place to place. The blocks are then placed in a retort, subjecting them to heat in the usual way.

The Question of Cremation.

A bill has been introduced in the Legislature of Pennsylvania by the provisions of which cremation is to be made a misdemeanor, punishable with fine and imprisonment. This is legislation worthy of the dark ages—we were going to say, worthy of a savage people; but savages have generally shown too much sense to prevent a practice so approved by all economic and sanitary considerations. It is indeed the case that peoples the lowest on the scale of civilization—that is, who study most closely the teachings of nature—and those furthest advanced in enlightenment and science, agree as to much that concerns the common affairs of life. The Indian tribes on the great plains, and the cultivated nations of antiquity, have both practiced cremation; the one because instinct and the other because reason and science taught them to do so. It is because we have departed far enough from the simplicity of nature to forget her laws, without having yet advanced into the higher fields of acquired knowledge, that we of this age oppose this most beautiful, healthful and natural method for disposing of the remains of the dead. We are materialists and wedded to matter. There lingers amongst us the notion of an actual, physical resurrection, that causes us to cling to the last form and vestige of our departed friends, with the decay of whose earthly bodies we prefer to associate ideas the most repulsive, rather than see them resolved through the refining element of fire into the most pure and ethereal elements of nature.

The public mind needs educating on this point. It requires to be disabused of the old teachings that lead it to grovel among the tombs, in the belief that there is something there to be remembered and cherished, instead of following all that is left of us after death to our real home. There is every reason—esthetic, economic and sanitary—why we should burn instead of bury our dead.

The Changes in the Mining Business.

It is undeniably true that the business of mining for the precious metals on this coast was inaugurated under conditions exceedingly unfavorable to its steady and healthful development. In the case of both gold and silver, the first finds made were of the richest kind, begetting from the start the most inflated ideas as to the methods to be employed in conducting this industry and the rewards it should bring. We embarked at flood tide, and it has taken a long time for us to learn how to navigate in the shallow waters of an ebbing prosperity. Gold was found here in great abundance, and under circumstances that admitted of its being obtained at first by a process that could in no sense be called mining. So, too, with the argentiferous ores first discovered; they were extraordinarily rich and easily accessible. In the Ophir deposits our prospectors had a bad standard whereby to search after silver mines. With more moderate notions as to the grade of ores that would do to work, they might have

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We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

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We have superior artists in our own office, and all facilities for producing fine and satisfactory illustrations of inventions and machinery, for newspaper, book, circular and other printed illustrations, and are always ready to assist patrons in bringing their valuable discoveries into practical and profitable use.

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Testing and Working Silver Ores.

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has just been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope:

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working sample, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patehen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles, Smelting, Mexican process, Chilean process, Krochke's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-bammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

The book is a serviceable one for miners' and prospectors' use. Price, post free, \$2.00. Address Dewey & Co., MINING AND SCIENTIFIC PRESS, 202 Sansome Street, San Francisco.

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A thoroughly studied and ably written treatise on this subject by Hon. B. B. Redding, appears complete in the PACIFIC RURAL PRESS for January 26th, and also the MINING AND SCIENTIFIC PRESS. Based upon facts, figures and careful and extensive observations made in various parts of the State on this important subject, it is a volume of reliable information, interesting to every resident of the State. The information is condensed in a paper read before the California Academy of Sciences, and is published in the Press as read before that Society without any alterations or omissions. Extra copies, post-paid, 10 cents. Address DEWEY & CO., Publishers, 202 Sansome Street, San Francisco.

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Name of Company.	Week Ending Mar. 7.	Week Ending Mar. 14.	Week Ending Mar. 21.	Week Ending Mar. 28.
Alpha.	114 1/2	10 1/2	9 1/2	7 1/2
Andes.	78 1/2	7 1/2	3 1/2	6 1/2
Alps.	350 1/2	75 1/2	60 1/2	45 1/2
Argent.	75 1/2	40 1/2	30 1/2	20 1/2
Baltimore Con.	41 1/2	40 1/2	34 1/2	28 1/2
Belcher.	74 1/2	20 1/2	85 1/2	70 1/2
Best & Belcher.	241 1/2	201 1/2	151 1/2	19 1/2
Bullion.	61 1/2	51 1/2	41 1/2	31 1/2
B. Tel.	11 1/2	7 1/2	1 1/2	80 1/2
Benton.	1 1/2	75 1/2	60 1/2	65 1/2
California.	2 1/2	2 1/2	2 1/2	1 1/2
California.	30 1/2	1 1/2	75 1/2	75 1/2
Challenge.	3 1/2	3 1/2	3 1/2	2 1/2
Chollar-Potosi.	3 1/2	3 1/2	3 1/2	2 1/2
Confidence.	5 1/2	4 1/2	4 1/2	4 1/2
Con Imperial.	75 1/2	70 1/2	60 1/2	60 1/2
Con Virginia.	22 1/2	24 1/2	24 1/2	24 1/2
Crown Point.	6 1/2	5 1/2	5 1/2	4 1/2
Dayton.	20 1/2	15 1/2	10 1/2	10 1/2
DeFrees.	65 1/2	30 1/2	40 1/2	40 1/2
Day.	11 1/2	8 1/2	1 1/2	1 1/2
Eureka Con.	4 1/2	3 1/2	3 1/2	3 1/2
Endowment.	70 1/2	65 1/2	70 1/2	60 1/2
Gen Thomas.	10 1/2	7 1/2	5 1/2	5 1/2
Grand Prize.	75 1/2	75 1/2	60 1/2	60 1/2
Gila.	80 1/2	60 1/2	60 1/2	60 1/2
Golden Charter.	90 1/2	81 1/2	81 1/2	6 1/2
Gould & Curry.	10 1/2	9 1/2	8 1/2	7 1/2
Hale & Norcross.	10 1/2	9 1/2	8 1/2	7 1/2
Hussey.	1 1/2	9 1/2	1 1/2	1 1/2
Justice.	10 1/2	8 1/2	4 1/2	7 1/2
Julia.	10 1/2	8 1/2	4 1/2	7 1/2
Leach.	22 1/2	24 1/2	24 1/2	24 1/2
Leviathan.	35 1/2	25 1/2	25 1/2	25 1/2
Leviathan.	40 1/2	35 1/2	35 1/2	35 1/2
Modoc.	70 1/2	60 1/2	55 1/2	50 1/2
Manhattan.	10 1/2	9 1/2	10 1/2	10 1/2
Meadow Valley.	20 1/2	25 1/2	20 1/2	20 1/2
Mexican.	15 1/2	13 1/2	11 1/2	10 1/2
North Con Virg.	10 1/2	11 1/2	1 1/2	1 1/2
New York.	10 1/2	11 1/2	1 1/2	1 1/2
Northern Belle.	10 1/2	8 1/2	9 1/2	8 1/2
New Coso.	70 1/2	60 1/2	50 1/2	50 1/2
Nevada.	1 1/2	1 1/2	1 1/2	1 1/2
Ophir.	54 1/2	52 1/2	34 1/2	25 1/2
Overman.	16 1/2	14 1/2	14 1/2	14 1/2
Panther.	30 1/2	35 1/2	30 1/2	30 1/2
Raymond & Ely.	51 1/2	41 1/2	41 1/2	41 1/2
Rock Island.	22 1/2	10 1/2	8 1/2	9 1/2
Sage.	12 1/2	10 1/2	8 1/2	9 1/2
Seg Belcher.	26 1/2	27 1/2	20 1/2	20 1/2
Sierra Nevada.	42 1/2	42 1/2	34 1/2	29 1/2
Sierra Hill.	22 1/2	2 1/2	1 1/2	1 1/2
Succor.	23 1/2	2 1/2	1 1/2	1 1/2
Solid Silver.	5 1/2	5 1/2	4 1/2	4 1/2
Star.	2 1/2	1 1/2	1 1/2	1 1/2
Trojan.	65 1/2	40 1/2	40 1/2	25 1/2
Union Con.	25 1/2	25 1/2	25 1/2	25 1/2
Utah.	13 1/2	13 1/2	11 1/2	10 1/2
Wells-Fargo.	10 1/2	5 1/2	10 1/2	5 1/2
Woodville.	80 1/2	65 1/2	45 1/2	35 1/2
Yellow Jacket.	11 1/2	10 1/2	8 1/2	7 1/2

Sales at S. F. Stock Exchange.

Friday A. M., Mar. 22.	850 Alps.	21@21
150 Alpha.	850 Belcher.	31@31
350 Andes.	220 Bullion.	4@4
180 Alps.	400 Best & Belcher.	11@11
640 Bullion.	480 Benton.	15@15
1300 Best & Belcher.	180 Belmont.	12@12
515 Belcher.	1000 Belle Isle.	1@1
300 Benton.	700 California.	28@28
100 Ohlar.	2000 Chollar.	2@2
2030 Crown Point.	50 Ohlar.	28@28
1870 Con Virg.	650 Crown Point.	5@5
515 DeFrees.	980 Con Imperial.	5@5
1070 Con Imperial.	600 DeFrees.	1@1
605 California.	260195	140 California.
100 Dayton.	100 Dayton.	10@10
440 Exchequer.	3100 Dayton.	2@2
270 Gould & Curry.	400 Dayton.	10@10
1635 Hale & Nor.	125 Exchequer.	310@310
405 Justice.	7100 Hale & Nor.	40@40
625 Julia.	2300 Hale & Nor.	90@90
150 Leviathan.	350 Gould & Curry.	1@1
1173 Mexican.	1145 Grand Prize.	61@61
1100 Monumental.	150 Gila.	60@60
600 New York.	8000 Hussey.	90@90
120 North Con Vir.	500 Hale & Nor.	70@70
325 Ophir.	3000 Horne.	2@2
270 Overman.	130 Jackson.	1@1
650 Savage.	655 Justice.	1@1
1760 Sierra Nevada.	380 Julia.	22@22
340 Silver Hill.	131@131	50 Kentuck.
125 Solid Silver.	500 Kentuck.	1@1
120 St Louis.	350 Leopold.	55@55
70 Succor.	100 Leviathan.	30@30
630 Trojan.	1125 Mexican.	121@121
350 Union Con.	450 Manhattan.	1@1
220 Utah.	4813 Modoc.	1@1
1000 Ward.	175 Nevada.	210@210
1200 Wells-Fargo.	200 Northern Belle.	8@8
200 Yellow Jacket.	500 New York.	80@80
	250 North Con Vir.	36@36
	129 Quant.	14@14
	100 Overman.	14@14
	100 Phenix.	2@2
	350 Ray.	42@42
	250 Ray.	3@3
	585 Sierra Nevada.	31@31
	545 Savage.	91@91
	75 Seg Belcher.	25@25
	750 Star.	2@2
	300 Succor.	1@1
	500 Silver Hill.	170@170
	1000 Silver Hill.	1@1
	3000 Tiptop.	245@245
	2650 Trojan.	30@30
	150 Utah.	16@16
	555 Union Con.	50@50
	100 El Dorado South.	70@70
	100 El Dorado.	31@31
	500 Gila.	20@20
	100 Golden Terra.	23@23
	945 Gould & Curry.	71@71
	945 Hale & Nor.	71@71
	1235 Hussey.	71@71
	650 Horne.	10@10
	150 Hamburg.	3@3
	800 Leads.	2@2
	800 Leopold.	55@55
	65 Mexican.	121@121
	1210 Modoc.	105@105
	15 Manhattan.	925 Con Virginia.
	20 Northern Belle.	840 Crown Point.
	1355 Nevada.	500 Chollar.
	1180 Ophir.	31@31
	45 Overman.	140 Dayton.
	190 Phenix.	200 Exchequer.
	10 Raymond & Ely.	275 Gould & Curry.
	300 Ray.	580 Hale & Nor.
	500 Silver Hill.	700 Justice.
	700 Star.	30 Julia.
	390 Savage.	20 Kentuck.
	180 Sierra Nevada.	400 Leviathan.
	300 Silver Hill.	1100 Modoc.
	535 Tiptop.	425 Mexican.
	170 Union Con.	50 North Con Vir.
	4200 Wells-Fargo.	1000 Wells-Fargo.
	200 Yellow Jacket.	1000 Wells-Fargo.

AFTERNOON SESSION.

650 Alps.	2@2
650 Alps.	2@2
300 Argenta.	4@4
270 Best & Belcher.	18@18
800 Belmont.	110@110
300 Belcher.	4@4
650 Bullion.	4@4
100 Benton.	80@80
225 Con Virginia.	19@19
180 California.	28@28
190 Crown Point.	28@28
100 Ohlar.	27@27
300 Con Imperial.	55@55
2650 DeFrees.	4000 Dayton.
300 Day.	250 Dayton.
555 Endowment.	500
100 Eureka Con.	39@39
100 El Dorado South.	150 Ward.
100 El Dorado.	31@31
450 Gila.	200 Golden Terra.
100 Golden Terra.	23@23
945 Gould & Curry.	71@71
945 Hale & Nor.	71@71
1235 Hussey.	71@71
650 Horne.	10@10
150 Hamburg.	3@3
800 Leads.	2@2
800 Leopold.	55@55
65 Mexican.	121@121
1210 Modoc.	105@105
15 Manhattan.	925 Con Virginia.
20 Northern Belle.	840 Crown Point.
1355 Nevada.	500 Chollar.
1180 Ophir.	31@31
45 Overman.	140 Dayton.
190 Phenix.	200 Exchequer.
10 Raymond & Ely.	275 Gould & Curry.
300 Ray.	580 Hale & Nor.
500 Silver Hill.	700 Justice.
700 Star.	30 Julia.
390 Savage.	20 Kentuck.
180 Sierra Nevada.	400 Leviathan.
300 Silver Hill.	1100 Modoc.
535 Tiptop.	425 Mexican.
170 Union Con.	50 North Con Vir.
4200 Wells-Fargo.	1000 Wells-Fargo.
200 Yellow Jacket.	1000 Wells-Fargo.

Saturday A. M., Mar. 23.

180 Andes.	50@50
180 Alps.	84@84
980 Alpha.	64@64

300 Solid Silver.	440@440
70 Silver Hill.	160@160
450 Senator.	5@5
265 St Louis.	33@33
70 Trojan.	1600 Grand Prize.
95 Utah.	100@100
145 Union Con.	51@51
150 Ward.	85@85
300 Woodville.	35@35
3300 Wells-Fargo.	50@50
50 Yellow Jacket.	75@75
310 Alta.	5@5
300 Argenta.	45@45
140 Alps.	5@5
20 Alpha.	7@7
195 Best & Belcher.	17@17
4435 Belmont.	2@2
200 Belle Isle.	60@60
200 Belcher.	60@60
100 Belcher.	270
400 Crown Point.	460@460
140 Con Virginia.	21@21
640 California.	17@17
225 California.	21@21
300 DeFrees.	65@65
1600 Dayton.	110@110
20 Dayton.	25@25
225 Eureka Con.	41@41
415 Exchequer.	23@23
500 Falcon.	50@50
1290 Grand Prize.	51@51
350 Gould & Curry.	35@35
200 Gould & Curry.	7@7
1350 Hussey.	110@110
850 Horne.	20@20
150 Hamburg.	35@35
400 Hale & Nor.	15@15
850 Justice.	71@71
35 Julia.	1@1
195 Leads.	185@185
140 Leopold.	55@55
1210 Modoc.	105@105
575 Mexican.	114@114
435 Manhattan.	10@10
1770 Nevada.	230@230
25 Northern Belle.	13@13
65 Overman.	13@13
1350 Ophir.	321@321
100 Phenix.	2@2
210 Raymond & Ely.	41@41
300 Silver Hill.	50@50
400 Star.	110@110
400 Silver Hill.	130@130
305 Savage.	2@2
1700 Tiptop.	27@27
500 Union Con.	5@5
65 Utah.	81@81
300 Young America.	40@40
100 Alta.	495@495
200 Andes.	45@45
70 Alpha.	7@7
420 Belcher.	280@280
120 Best & Belcher.	18@18
745 Bullion.	41@41
1100 Benton.	16@16
2105 Con Imperial.	45@45
410 Crown Point.	460@460
350 Chollar.	2@2
700 Con Virginia.	19@19
530 California.	27@27
240 California.	11@11
30 Confidence.	13@13
100 Dayton.	71@71
300 Exchequer.	21@21
470 Gould & Curry.	6@6
1000 Hale & Nor.	64@64
535 Justice.	71@71
500 Julia.	2@2
50 Kentuck.	3@3
1300 Leviathan.	40@40
1305 Mexican.	110@110
100 North Con Vir.	40@40
75 New York.	55@55
300 Overman.	12@12
1505 Ophir.	29@29
550 Sierra Nevada.	265@265
125 Solid Silver.	61@61
575 Silver Hill.	160@160
300 Trojan.	28@28
1100 Union Con.	490@490
200 Utah.	81@81
180 Woodville.	35@35
3400 Wells-Fargo.	50@50
320 Ward.	75@75
20 Yellow Jacket.	75@75
310 Alta.	5@5
660 Alps.	215@215
200 Argenta.	45@45
10 Alpha.	7@7
100 Alpha.	7@7
350 Bodie.	145@145
120 Bullion.	41@41
140 Belcher.	323@323
100 Belcher.	1800
1125 Belmont.	2@2
430 Best & Belcher.	17@17
1050 Con Virginia.	19@19
435 California.	27@27
320 Crown Point.	460@460
90 Chollar.	2@2
1190 DeFrees.	60@60
1270 Day.	135@135
225 Eureka Con.	42@42

SALES OF LAST WEEK AND THIS COMPARE.

Thursday A. M., Mar. 21.	Thursday A. M., Mar. 22.
2350 Alta.	410@410
450 Andes.	45@45
840 Best & Belcher.	161@161
495 Belcher.	363@363
1235 California.	49@49
1000 Con Virginia.	19@19
185 Chollar.	25@25
929 Crown Point.	45@45
1000 DeFrees.	12@12
1070 Con Imperial.	55@55
195 Challenge.	75@75
500 Dayton.	10@10
655 Exchequer.	310@310
200 Leviathan.	37@37
680 Hale & Nor.	71@71
1175 Julia.	180@180
470 Justice.	61@61
200 Kentuck.	3@3
515 Mexican.	111@111
1235 Mexican.	111@111
900 Monumental.	15@15
220 New York.	70@70
1530 Ophir.	21@21
250 Overman.	12@12
1050 Savage.	8@8
25 Seg Belcher.	3@3
420 Sierra Nevada.	3@3
215 Silver Hill.	16@16
3325 Solid Silver.	4@4
20 Succor.	1@1
1050 Trojan.	25@25
350 Union Con.	51@51
400 Ward.	75@75
103 Woodville.	45@45
600 Wells-Fargo.	50@50
250 Alps.	21@21
775 Alta.	480@480
150 Belcher.	4@4
300 Bodie.	3@3
220 Best & Belcher.	17@17
100 Bullion.	490
700 Belmont.	1@1
1300 Belle Isle.	55@55
150 Bodie.	1@1
165 Con V.	19@19
20 Chollar.	27
250 Con Imperial.	55@55
300 Crown Point.	460@460
900 Day.	101@101
800 DeFrees.	40@40
75 Eureka Con.	33@33
75 Eureka Con.	33@33
400 Falcon.	40@40

AFTERNOON SESSION.

30 Alpha.	71@71
30 Argenta.	4@4
30 Bullion.	21@21
30 Bodie.	3@3
1600 Belle	

Iron and Machine Works.

THOS. PENDERGAST.

HENRY S. SMITH.

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MANUFACTURERS OF

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ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

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PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasmotors, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the lowest possible terms.

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Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

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Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

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Kinds of Machinery for Mining Purposes.

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And General Machinists.

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Boiler repairs promptly attended and at very moderate rates.

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Among the advantages gained by this holder are the following:

It can be opened and closed quickly. The points are less obstructed while the articles to be filed are being placed.

The papers (wholly or partly folded) can be either "straddled" over the lower bar, or filed in regular book order.

The elastic hinge and band accommodate and hold firm either a large or small number of papers. With less material, it is lighter and less cumbersome than other holders, and approaches nearer to bookbinding. It has no rigid hooks, hinges or loose parts to break or get lost.

It has proved durable in practice. The file is adjusted but 52 times a year for a weekly paper, and a sample holder can be opened and closed 1,000 times without showing wear.

Five sizes are made to suit the dimensions of different papers, viz.: 18, 22, 26, 30 and 34 inches, inside measure. Single samples will be mailed from office for 50 cents, (and upward, according to size), postpaid. Wholesale and retail agents wanted.

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Tip-top Dinners, 50 Cents,

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The cost of Roasting and Chloridizing is as follows:
One man, per day.....\$ 3 50
One man, per day.....3 00
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From 2½ to 5 per cent. of salt is necessary.

In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

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J. S. COXE, Vice-President Tehama County Bank, Red Bluff, Cal. R. H. CAMPBELL, Superintendent Afterthought Mine, Redding, Shasta County, Cal.

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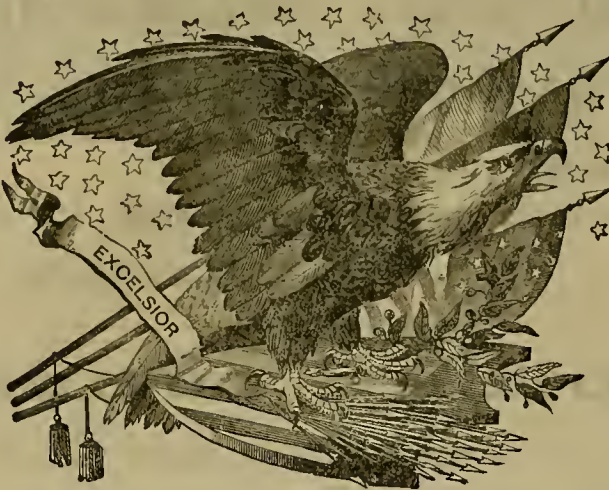
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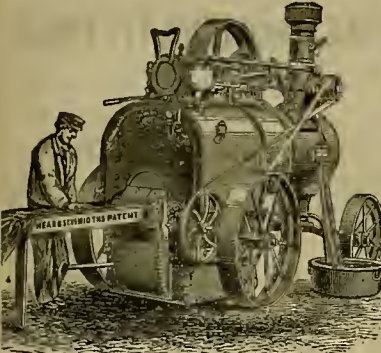


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One large sized Rock Breaker, Varney & Rix, size 9x15; one Wood Splitting Machine; one 36-inch cylinder Russel Separator, (with extra cylinder, and Lauffenberg shoe—very cheap, on account of owner's death; (will be sold with or without any of above engines.) All of the above second-hand engines have been in shop and overhauled, and are in good working order. Various other machinery for sale. Purchase made on Commission. Machinery repairs solicited. Specialty of Portable Engines and Boilers for threshing.

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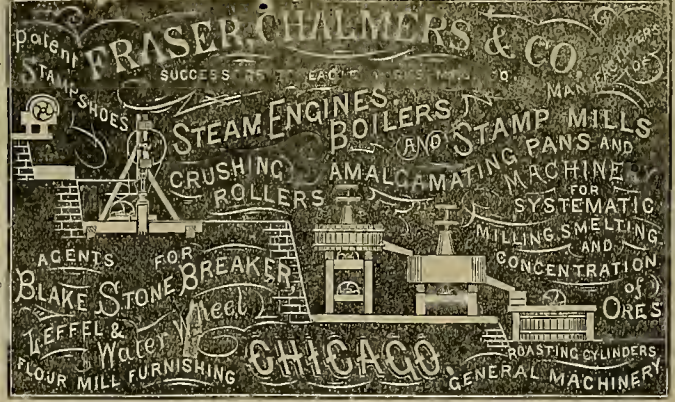
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Two Barns, one of them 100x40 feet, and the other 40x40 feet, a Granary, Woodshed, Chicken House, and a No. 1 Dairy House, new last year. There is a bounteous and never failing supply of good soft water at both the Dwelling and Dairy Houses.

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Handsomely colored and mounted, now ready for delivery. Retail, on rollers, for the wall, \$2.50 each; in covers, \$1.50 each.

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This work is unequalled by any other published, embracing the subjects treated. Its authority is highly esteemed and regarded by its readers; containing, as it does, much essential information to the Miner, Metallurgist, and other professional workers in ores and minerals, which cannot be found elsewhere in print. It also abounds throughout with facts and instructions rendered valuable by being clearly rendered together and in simple order. It contains 120 diagrams, illustrating machinery etc, which alone are of the greatest value. PRICE, \$7.50

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We have just issued a pamphlet containing the General Mineral Land Laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1866; Mining Statute of July 9th, 1870. Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Registers' Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Charge of Fees; Proof of Ownership and Possession, in Case of Loss or absence of Mining Records; Affidavit of Citizenship; Certificate that no Suit is Pending; Power of Attorney; Protest and Adverse Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, postage, for 50 cents. It should be in the hands of every one having any mining interests. DEWEY & CO., Publishers of the MINING AND SCIENTIFIC PRESS, S. F.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, APRIL 6, 1878.

VOLUME XXXVI.
Number 14.

The Howell Roasting Furnace.

We give an engraving herewith representing the "Howell Improved 'White' Roasting Furnace," manufactured by the Pacific Iron Works in this city. The engraving shows one of the latest improved forms of the furnace as adapted for the treatment of rebellious gold and silver ores.

The main fire, which enters the lower end of the cylinder and passes entirely through it, is shown at the right side of the cut, where the wall of the ore chamber is broken away.

The ore is regularly and continuously fed from the ore hopper into the upper end of the cylinder by the "screw conveyor" (shown above the upper end of the cylinder, at the upper side of the cut), and continuously showered through the heated air and gases any requisite length of time, by means of the "ribs" or projections formed in the interior brick lining of the cylinder, and regularly progressed through it (with more or less speed, as desired, by changing the inclination or speed of its rotation), and discharged into the ore chamber, as is also shown at the right side of the cut.

The wall of the chamber at the upper end of the cylinder, at the left side of the cut, is also broken away to show the position of the "auxiliary" fire, and the construction of the dust chambers, etc.

The "auxiliary" fire is provided for the purpose of reducing the finer particles of the ore, which are prevented, by the upward draft from the main fire, at the lower end of the cylinder, from passing through it. These finer particles, in many cases, constitute near 20% of the whole amount of the ore treated, and as it is necessary to locate the principal fire at the lower end of the cylinder in order to increase the heat on the ores as they are progressed downwards through it (which is an indispensable condition for roasting ores, well known and admitted), this "auxiliary" fire is, therefore, an indispensable requisite for the roasting of these finer particles, which are carried back to the draft.

As will be seen from the cut, the mechanical construction of the furnace, and its operation, by which the ore is kept constantly "showering" and progressing through it, is of the simplest kind. It is also cheaply operated, one and one-half horse power and from one to two cords of wood per day being all that is required for the largest size, 41 inches in diameter and 27 feet in length, capable of roasting from 15 to 25 tons in 24 hours. A small percentage of salt only is required for chloridizing roasting.

In this furnace, as covered by the "White" and "Howell" patents, are combined the three acknowledged requisites for thorough and economical roasting and chloridization of ores. 1st. Continuous progression through and discharge of the ores from the furnace, while in the meantime they are, by being constantly "showered" through the heated air and gases within it, exposed in the greatest possible degree, to their reducing action. 2d. Subjecting the ores to this "showering" process any length of time, or dropping them across the space within the furnace any number of times and distance (ordinarily about 1,000 feet), that may be necessary in any given character of ore, for its thorough reduction; and 3d and last, but not least, increasing the heat on the ores as they are progressed through the furnace. It will, therefore, chloridize the most refractory ores up to from 80% to 98% of their assay value, depending upon their nature and grade.

This furnace has become recently so well-

known, and so widely introduced, that some facts concerning its history will be of interest to the mining public.

The main device of the open and inclined revolving brick-lined cylinder, with interior projections for showering and continuously progressing the ores, and with but one fire, located at and passing with the ore into the upper end of the cylinder, was patented in 1864, by G. W. White, and he attempted in another device, patented in 1865, to obviate the fatal defect of exposing the ore at the beginning instead of the end of the process to the greatest degree of heat; and also to avoid the carrying back of the finer particles of the ore by the draft—if in order to increase the heat on the ores, the fire should be located at the lower end of the cylinder, to which his first device was subject; by constructing within the cylinder a central flue, for the separate passage of the flames from a fire located at the lower end, and constructing a number of separate ore channels or passages (having projections) around the central flue, for the separate passage of the ore, and to protect it from the draft and discharge it from the hotter end of the cylinder. The device was, however, for evident

Territories, with the essential and valuable features of both patents combined, except the Pacific Iron Works.

The furnace, as at present constructed, requires no special skill in its management that cannot be readily acquired, and any one capable of conducting an ordinary silver reduction mill, with the aid of the plans furnished when necessary, erect and operate it. Different sizes are made, having capacity for roasting the ore crushed by a five, 10 or 20-stamp mill. The first cost will, in most cases, be less than reverberatory furnaces of equal capacity, while the cost of roasting in it will, in all cases, be less than one-fifth the cost in the latter, effecting a saving of at least \$2.50 per ton. One of the forms of this furnace constructed, different from that shown in the engraving, has a partial brick-lined cylinder, which is better adapted to the treatment of some descriptions of ore than the full brick-lined cylinder.

It is fortunate for the mining public that this valuable furnace is now so improved and made practicable as to admit of general introduction, and all litigation on the subject of the patents having ceased, parties can now purchase un-

Cobalt and Nickel.

While for many years past the discovery of nickel and cobalt on this coast has, from time to time, been announced by our prospectors and miners, we cannot learn that either of these metals has as yet been made the object of especial search, or been collected in any large quantity. That they really occur at various places both in this State and Nevada admits of no doubt, but how pure or how plentiful the ores of these metals may be we are not advised. It is possible that where found at all they occur only in such limited quantity that our miners have not thought them worthy of attention, or possibly of a very low grade, at remote localities, or under such other conditions as would render them of little economic value. Again, there may not always have been on this coast such a demand for these ores as would seem to warrant the California miner in searching after and exploring deposits of this kind, a circumstance that may tend to further explain why they have been so generally neglected.

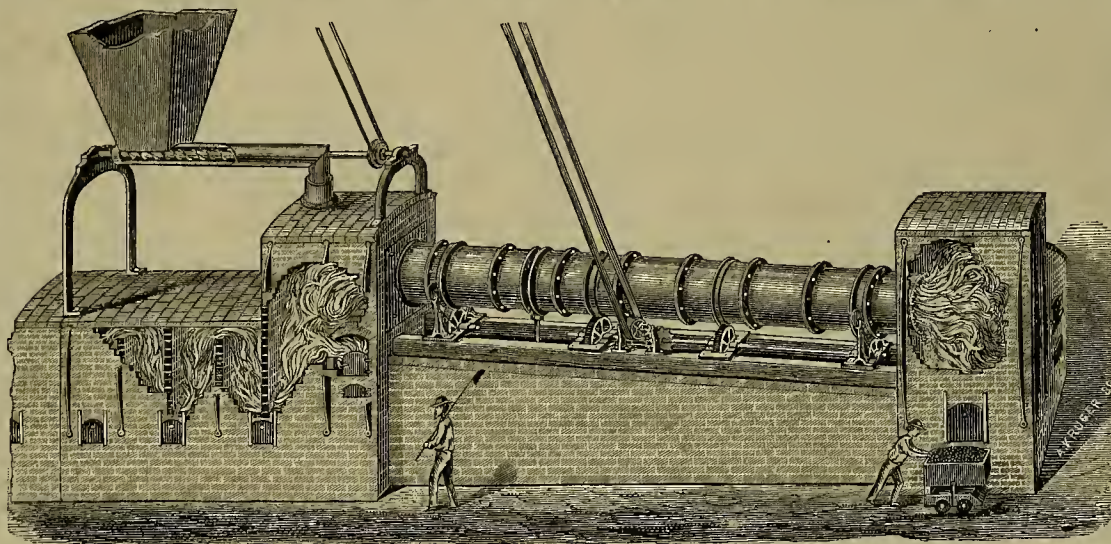
However this may have been, a demand for both cobalt and nickel at Liver-pool and other large centers of trade and consumption, has created a market in this city for both; one of our leading assayers having recently received, from the proprietors of extensive metallurgical works in England, directions to purchase, on their account, any lots of such ores of the requisite grade as he might be able to get hold of.

The determination of Germany to largely replace her smaller silver and her copper coins altogether by nickel, and the somewhat extensive use of this metal for coinage purposes by our own Government, have doubtless had something to do with producing what seems to be a scarcity of nickel in the principal markets of the world. Without, however, attempting to track to its probable causes existing requirements for these metals, it will suffice to have acquainted our miners with the fact, that they may be on the lookout for them while exploring for gold and silver, the geological formations likely to carry the ores of the precious metals being also favorable for the occurrence of cobalt and nickel.

Some of the localities in which the ores of nickel are reported to have been discovered on this coast are Pine Flat, Sonoma county, and near the town of Dutch Flat, Placer county; there being others which we cannot now call to mind. Cobalt was found several years since, near the head of Walker river, Alpine county, where, at the time, there was said to be a large deposit of this ore. The two ores frequently occur, however, together, and are generally associated with other metals and minerals, such as iron, copper, arsenic, lead, sulphur, etc.

As these metals are employed not only for coinage but also largely for alloys, for plating and other manufacturing purposes, their consumption is likely to be great hereafter; insuring for them good prices and what is of more importance to the miner, a market free from constant fluctuation, the frequent changes in price having heretofore tended to discourage search after these ores. Parties having either nickel or cobalt ores to be disposed of, would do well to address J. S. Phillips, assayer of this city, who will act here as agent of the English house spoken of, in the examination and purchase of this class of ores.

ALREADY counterfeits of the new silver dollar are in circulation. They so closely resemble the genuine coin in appearance and ring that none but experts can well detect the difference.



THE HOWELL IMPROVED "WHITE" ROASTING FURNACE.

reasons, absurd and impracticable; and he next attempted to adapt his first device to the roasting of ores, but it proved to be a failure, for the very reason that in it the heat on the ore was being constantly decreased during the process, instead of increased.

After many experiments and failures, Mr. John Howell at last succeeded in adapting the "open" inclined cylinder (covered by the first patent to White) to the roasting and chloridization of ores, by combining with it certain devices of his own invention.

These devices consist, mainly, in the location of the principal fire at the lower end of the cylinder (instead of the upper end, as in White's) by which the heat on the ores, as they progress through the cylinder, is increased instead of decreased; and also in locating the "dust" chambers near the upper end, and providing an "auxiliary" fire-place, which connects with the flue, or passage, leading from the upper end of the cylinder to the dust chambers, and by which means the finer particles of ore, which are carried back by the draft, are also roasted and collected in the "dust" chambers (shown in the left side of the engraving).

These devices are secured by patent to Mr. Howell, dated May 1st, 1877, and the Pacific Iron Works are, with Mr. Howell, sole owners of the same. Mr. J. M. Thompson, by virtue of an assignment made by an order of the court, is an owner of an interest in the White patents, and arrangements have been made with him, so that the White and Howell patents are now used in the furnaces constructed by the Pacific Iron Works, and which we have described. Accordingly, no other parties have the right to construct a furnace for the Pacific States and

doubted rights, as above stated, without incurring danger of infringement suits.

The furnace, made in either one or the other forms, having the full or partial brick-lined cylinder, has been erected and successfully operated at the following mines in California, Nevada and Arizona Territory, viz.: Jefferson, Comanche, Leopard, Ural, Star, Navajo, Grand Prize, Peck, Tiptop, Hackberry and Endowment, and at least 10 of them are now in successful operation, in some of the cases reducing ores of the most refractory character.

WANTS A MINT.—The Salt Lake Tribune, commenting upon the Utah mines, says the *History of the Ontario*, is given daily in letters of silver; Cottonwoods presents a brighter front, and is yielding more than at any time previous; the mines of Tintic are making paying shipments; Bingham will be unusually active this season; Ophir and Dry Canyon are looking well, while Leeds is decidedly the best silver producing camp in the Territory, though the huge hodies of ore in Frisco district cannot be exhausted in 10 or 15 years. The article closes as follows: Situated in the heart of the richest mining region of the world, and in view of the increasing yield of our mines, Salt Lake City is justly entitled to a Branch Mint. Our city is supported by the silver produced from the mines. We have no other resources but mineral, and it is not asking too much when we demand a place right at home where we can coin our own bullion.

A WINDSTORM visited the vicinity of Chicago last week, and did considerable damage to the shipping. One man was killed.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Notes from Nevada County.—No. 1.

[By Our Traveling Correspondent.]

EDITORS PRESS:—The outlook for a good yield from the mines of French Corral, Sweetland, Cherokee, Columbia Hill and North Bloomfield (the only points visited in the upper part of the county) is considered excellent. Their drawbacks have been comparatively slight. Water is abundant and much may be expected from all these localities, more particularly from the first and last named.

A new and promising enterprise is now in full blast, a mile above North Bloomfield, under the management of Mr. E. Derbec, so well known as the publisher of one or more of the leading French papers of San Francisco. Allusion is made to what is known as

The Derbec Blue Gravel M. Co.

The claim adjoins that of the somewhat celebrated North Bloomfield gravel mining company, of which you have had full and frequent mention, and consists of 400 acres, or 5,200 feet in extent, on the Great Blue lead. The company broke ground for the first time in September last, since which they have erected hoisting works of more than usual power, a large boarding house and other necessary buildings and have sunk to the depth of 315 feet. The shaft is 13 feet six inches by five feet two inches in the clear, with three compartments, all strongly timbered, passing through clay and cement into the blue gravel of the North Bloomfield company's formation. They have thus far encountered no water in sufficient quantity to afford trouble, but have found enough gold and other indications to satisfy them that they are close on the track of a treasure worth seeking.

Mining Around Nevada City.

They have here their drift claims, their hydraulic claims and a host of quartz claims. They have tried processes both new and old, and in some instances the new have resulted in considerable losses to stockholders, and yet, nothing discouraged, they seem willing (not the same parties, of course; they are sick enough) to try, try again. This is the way to succeed, and far be it from us to cry wolf before one is in sight. Nothing ventured, nothing made. There can be no progress without loss or risk to some.

In addition to the chlorination process, so long in successful operation at the works of Mr. O. Maltman, and at one or more of the mills in the vicinity, at least two establishments have been recently erected, one with the view of securing a larger yield, in both gold and silver, from the sulphurets, and the other for the reduction of ores after a simpler and cheaper method than any now in use. Those most interested no longer look upon these undertakings as problematical. They consider them an established success. I know too little of either to venture an opinion. I have not yet forgotten how hopefully I looked on an experiment here, less than a year ago, that has since resulted in a disastrous failure. I could see no flaw in the theory, but it failed when put into practical operation on a large scale. Time is the best test and we can afford to wait.

One of the enterprises referred to is that of Pioneer Reduction Company of California, working under what is known as the Crosby process, patented by Prof. A. B. Crosby, who has charge of the works. The ore is crushed and concentrated in the usual way. The concentrates are roasted in a revolving-cylinder furnace, the roasting being carried to the complete oxidation of the mineral.

The roasted material is then ground almost to the fineness of flour in burr mills, whence it is conducted, by mechanical appliance, to a washer, by means of which all soluble matter deleterious to amalgamation is removed. It is now ready for the amalgamator, the principal advantage claimed for which consisting in some peculiar devices for so circulating and controlling the quicksilver, as to keep it constantly renovated.

There are one or two parts of the machinery deserving of special mention. The draft of air through the furnace is produced by a suction-fan, to prevent the gases from passing into the mill. Attached to the furnace also is a settling chamber, divided into a series of compartments, through which all the gases and finer particles are carried by the draft, by means of which the fine dust is arrested for reworking. All, I believe, that is claimed for the process, is simply a cheap and effective operation for working the refractory ores of the coast, not requiring the skill of a scientific expert to run it. Much interest is felt in its established financial success, as it is understood that similar enterprises are to follow in its wake.

Little information was gleaned as to the modus of reduction, in detail, in the other establishment, partly for reasons which you, as patent agents, well understand. The works have been very recently put up by Mr. S. O. Brown, for the purpose of working

Chlorinated Tailings.

For the silver as well as the gold. For the benefit of those not familiar with such matters,

it may be well to state that the tailings alluded to are the residue of sulphurets already worked by the chlorination process (one of the best, if not the best known, for securing the highest results), a fact sufficient in itself to give zest to the present experiment, if such it can be called. The machinery consists of a 40-horse engine, two large-sized combination pans from the Pacific iron works, in your city, one large settler, a Harrison mill and a drier of Mr. E.'s own device and construction, small, but ingenious and apparently well adapted to the purpose, the whole having a capacity of reducing about 20 tons per day. The proprietor is going along in a quiet way, seemingly avoiding rather than courting notoriety, but fully confident of success.

Gravel Mining Around Nevada City.

The English company and the Sailor Flat company, at Blue Tent, are both represented as doing better than at any time previous.

The former have two bedrock tunnels, and are working two claims, the gold being plainly visible in the gravel of each.

The Manzanita Gravel M. Co.

Just in the edge of town, have a lead, reported as 600 feet in width, and a bank of 200 feet in height, and each cubic foot of dirt on the bottom of channel, said to pay not less than one dollar. From this up to the height of 30 feet, they have pay gravel. I was informed by Mr. J. W. Hart, the Superintendent of the mine, that the company had just completed a bedrock tunnel at a cost of \$103,000, and that they are now opening up the shafts for business.

The Cold Spring Gravel Co.

Sunk last year on the south side of the ridge, through which the lead is thought to run, finding some pay dirt, but what is supposed to be a by-wash, as the bedrock is found pitching north. They have in consequence removed their works and are sinking a perpendicular shaft, nine by three feet of three compartments, expecting soon to strike the Manzanita lead, well-known as one of the richest in the county. It is a drift claim.

Herschman & Co.

Are expecting a larger clean-up the present season than usual. This claim has been worked since the year 1852, at that time being run by Mr. Mattison, the originator of the hydraulic. It has yielded in the gross as high as \$30,000 per water season, and has generally paid a handsome dividend. It is worked by hydraulic, using 700 inches of water under a pressure of about 200 feet, sluice tunnel 1,500 feet and flume 1,500 feet, or total length 3,000 feet.

We come now to quartz. The claim of

The Providence G. & S. M. Co.

Situated on Deer creek, one mile below Nevada City, consists of 3,100 feet in length on the ledge, every foot of which contains ore, some small strata being exceedingly rich, going so high into the thousands or rather ten thousands, that the statement would hardly be credited, besides being of little consequence, except so far as the knowledge of the fact might throw light on the general average of the rock. It is understood that as much as 1,000 tons of heavy sulphureted ore, worked by chlorination, averaged \$120 per ton. The remaining and poorer ores run from \$8 to \$17. The hanging-wall is grauite, and the foot-wall slate. It has been worked by the present company some six years. They have attained by incline shaft a depth of 923 feet, and have run a cross-cut from the hanging-wall in one place, 118 feet without yet reaching the foot-wall, cutting in its course five different veins of ore, some of them represented to be not less than five feet in width. Many more important facts might be given, pointing to the value of this property, which are withheld in courtesy to the wishes or preferences of some of the leading owners. They will not be likely, from the experience of the past, to try any more new processes. They have a fine 20-stamp mill fully and completely equipped in every department, and work their sulphurets to great advantage by

The Chlorination Process.

Some little of the details of which as here conducted, are now given for the benefit of those not yet initiated into its mysteries.

1st. Sulphurets are roasted in a reverberatory furnace.

2d. They are then put into vats where they are subjected for about 36 hours to the action of chlorine gas.

3d. Lixivated with water (leached), at which point the gold is in solution.

4th. This solution is precipitated by the use of sulphate of iron, and lastly transferred to other vats where all the base metals are destroyed or extracted by the action of sulphuric and other acids required for the purpose.

The Nevada Gold Quartz M. & M. Co.

Own the property formerly known as the Soggs mill and mine on the opposite side of the creek from the Providence. They have two engines, one for pumping and another for sinking, with a capacity for reaching a depth of 1,500 feet. They have an incline of 500 feet on the ledge, with a good chute of rock; also 2,000 feet of drifts, one 900 feet in length and within 200 feet of what is known as the Soggs' big chite. Everything about mill and mine is in good trim and its future reported promising. The rock has ranged from \$8 to \$70 per ton. Mr. John Berry, Superintendent.

The Consolidated Wyoming.

Mr. J. M. Buffington, Jr. Superintendent. This company claims two ledges, aggregating 4,000 linear feet. They are situated at no great distance below the Soggs ground and also on

the opposite side of the creek from the Providence, which is now viewed as the leading mine of the district, a fact of no little interest to the Wyoming company, if the future should demonstrate that they are located on the extension. No time was afforded for a close personal examination, but if one of their ledges, as I was informed, adjoins on the north that vein of the Providence lying nearest the slate, they may find by crosscutting that they are in possession of a true contact vein and of a property rivaling in value that of their millionaire neighbor across the way, whose formation may well be regarded as one of the best in the State. Two shafts have been sunk, the south, 380 feet, and the north, 300 feet. They have a drain tunnel on the 380-foot level 1,900 feet in length, following the ledge and are still driving it. Their quartz works from \$5 up to \$78 per ton, exclusive of the value of sulphurets. They have a 16-stamp mill run by water power, with an average working capacity for 32 tons per day.

The Royal Mine.

Perhaps better known as the Smith, has two locations of 1,500 feet each, lying in a species of rotten granite and easily worked. Greatest depth, 135 by shaft. It varies from 6 to 40 inches in width, with an average of 20, the narrowest portions paying the best. Above the 135-foot level, it has been worked, more or less, the distance of 2,150 feet, the last quartz, just as it came from the mine, going upwards of \$100 per ton, sulphurets not included, some of the decomposed sulphureted rock yielding as much as \$1,100 per ton.

The New England G. M. Co.

R. T. Wade, Superintendent. Incline shaft 350 feet, 800 feet of drifts, and a pay chute developed of 255 feet; average width of lode about two feet.

It is understood that something over 2,000 tons of rock have been crushed the past year, yielding from \$20 to \$30 per ton. They have new and substantial hoisting works, that will enable them to sink at least 1,000 feet. Their incline is still being energetically driven, showing at the bottom a good strong two-foot vein.

The Brunswick.

adjoining on the same vein, and, at present, worked through the same shaft, is under the superintendence of Mr. J. T. Lockhart, a valued acquaintance years ago, at Carson City. A pay chute has been opened up, 135 feet in length, with a good ledge still in the face of the drift. The company are at present extracting and working ore at the rate of about 20 tons per day.

The Pittsburg

(Old Wigham), Capt. John White, Superintendent, is said to have enriched some of the past owners. Incline on the ledge is down to the 800-foot level and drift, from bottom of shaft south, 141 feet, intersecting a good body of ore, which is represented to contain, besides much free gold, some very rich sulphureted rock. The north drift on same level has been driven 104 feet, with 50 more to run before reaching the pay chute developed in the level above. Quartz, in these pay chutes, is said to be worth, inclusive of sulphurets, about \$25 per ton. The company has been recently running on some rather poor rock extracted while putting the mine in good shape for the future operations. They have also been driven to the expense of erecting new hoisting works, the old having been previously burnt down. They have a good 10-stamp, rock breaker, three concentrators (Hendy's), and the usual modern appliances, besides a substantial link-motion hoisting engine, also a recent addition to the machinery, and hope soon to have the mine once more in a good paying condition.

The Buckeye.

Owned by Mr. James Kitts, is situated between the slate and granite, and reported four feet in width, in some points widening to 15 or more. Tunnel, 400 feet; greatest depth reached from surface, 190.

The rock mills from \$8 to \$40 per ton, some of it glittering with fine gold and rich sulphurets. My friend Kitts also owns the Oriental mill of eight stamps, at present doing good service on custom work, and hopes soon to be able to run it again on his own rock.

The Deadwood.

(J. J. Lyons, Superintendent), in the same neighborhood and two and one-half miles above Nevada City, has a tunnel 1,100 feet in length, striking ledge at 850 feet from its mouth and following it the remaining distance. It is now within 100 feet of an incline on the lode from which the company took rock that paid them as high as \$40 per ton. The croppings are said to have yielded not far from \$150,000. So, taken altogether, the company, to say the least, have a very promising prospect. A short distance below the last described is situated the mining ground of

The Murchie M. Co.

Of 430 acres of mineral land, secured by U. S. patent, 160 of which is gravel worked by hydraulic and paying well. Included in this valuable property there are not less than seven quartz ledges, as shown by the developments, the largest amount being made on the Independence and Big Blue, over which the hoisting works have been erected. The former has a direction north and south, the latter east and west. The Big Blue at the 400-foot level, the greatest depth attained, is four feet in width, and the ore found richer than at any point above. Drifts of 170 feet east and west on this level, develop a continuous body of ore, the whole of which is extracted and worked. The company

have a mill of 18 stamps, employing for power both water and steam. They crush from 25 to 30 tons per day, which yield from \$15 to \$18 each; average per ton of the sulphurets, \$100.

From this brief sketch, the reader will form but a very faint conception of the vastness and value of the property. The company, fully conscious of its worth, are preparing for a complete and systematic development of the same, and are from time to time making additions to the works, being now on the eve of constructing a tramway from mine to mill to farther facilitate operations.

A. C. K.

The Mines at Yankee Jim's.

EDITORS PRESS:—We are having more rain to-day (March 27th) and the Forest Hill divide mining companies are pushing things rapidly. They feel confident that the amount of gold taken out during the winter's run will equal that of average mining seasons. Breece & Wheeler, of Bath, have recently made a clean-up in their celebrated claim (the first of the season) after a run of about 20 days, and it is currently reported they took out \$17,000, and expect the second run to be much larger. They own an excellent water right and expect the water will hold out until late in the season, as their ditch drains a good water shed, well up in the snow regions. McGilvery, of the Dardanelles, has been washing the gravel off at a lively rate since the water season set in. He put off a blast about a week ago, charged with Judson powder, which is said to have done good execution.

The Lehigh company's tailings claim is situated in Volcano canyon, and receives the tailings from the Breece & Wheeler claim, and it is said they will clean up \$8,000 during the summer. Two years ago they made a clean-up of \$12,000, after a long season's run. Pond & Co., of Todd's valley, have plenty of water and are pushing things in good earnest. It is not publicly known how well their claim is paying. The Hidden Treasure, or Sunny South, a new and extensive drifting claim, situated about four miles above the Michigan Bluffs, is paying well. The Mountain Gate, at Damascus, is a very old mine, but I understand the owners have struck a new and very rich lead and that it is now paying as well as formerly.

SUBSCRIBER.

Mutual Rights of Passengers and Railroad Companies.

For the guidance of those who travel on railroads, it may be well to state that the following has been established by the rulings of the courts, in regard to the rights and privileges of both passengers and the railroad companies or their agents:

The railroad company has power to make reasonable regulations to guide and govern its agents in the discharge of their duties, and for the conduct of passengers while in its trains.

So long as a passenger shall comply with the reasonable regulations of the company he has a right to remain in the cars, and to be carried over the road. If, while thus complying, the conductor, officers, agents, or servants of the company, shall eject him from the cars they will be liable in damages for all injuries sustained. If a passenger who has paid his fare and behaves himself well, is removed by the servant of the company having charge and control of the train, the company cannot escape the responsibility for this unlawful act.

A regulation, made by a railroad corporation, requiring passengers to exhibit their tickets when requested to do so by the conductor, and directing the ejection from their cars of those who refuse so to do, is a reasonable and proper one. The passenger must conform to such regulations, or forfeit his right to be carried further.

A rule or custom of a railroad company requiring passengers, soon after starting, to surrender their passage tickets to the conductor and receive his checks in place of them, is reasonable.

The removal of a passenger by a conductor for refusing on demand to produce a ticket or pay fare for his passage, was a proper exercise of the company's right, for which, when exercised in such a manner as to do no unnecessary injury to person removed, the company is not liable in damages.

If a passenger persists in his refusal to pay fare until actually ejected, he forfeits his right to re-enter the car, even though he tender the demanded fare.

A railroad company has the right to make a moderate discrimination in the rate of fare between those who purchase tickets and those who do not. If a passenger has not procured a ticket he must pay the additional rate or be removed from the train.

A railroad company must afford reasonable facilities for procuring tickets, but the ticket office need not be kept open after the advertised time for the train to depart.

BOTANICAL HONORS.—Two persevering workers of the Santa Barbara Society of Natural History, says the *Press*, have been honored by having marine plants named for them. Prof. Farlow, of Harvard College writes that of two new algae lately found at Santa Barbara, one has been named for Mrs. C. P. Bingham, and the other for Miss Helen Lennebecker.

MECHANICAL PROGRESS.

Italian Marble Sawing Machinery.

An English work on minerals, lately published gives an account of the famous marble quarries of Italy, and the machinery used: "All along the streams at Carrara, Massa and Servavezza, are numerous water-mills, where the blocks are sawn into slabs for table-tops, and the smaller pieces are made into squares for pavements, etc. The sawing frames are set into motion by water-power. Some mills have mechanism of the rudest kind consisting simply of a wooden rectangular frame with iron blades, a pair of frames being attached eccentrically by a wooden rod to a small water-wheel; but generally speaking, this almost barbarous method has been superseded by more complicated and better machinery; in such mills the frame are suspended by chains at each angle from a second rectangular frame at the height of about ten feet, supported on four posts. The saws are simple iron blades, nine feet or ten feet long; 18 to 24 are fixed into a massive rectangular frame, generally at intervals of one inch, and thus a block of marble is cut at once into numerous slabs. Several sawing frames are placed parallel to each other, and perpendicular to the axis of a wheel to which they are attached by a connecting-rod, motion being communicated by an eccentric. The saws descend gradually as desired by means of a rope passing round a wooden cylinder, with a stone to counterpoise at the end; the motion of the water-wheel is connected by gearing to the main shaft, on which are work drums corresponding to each frame. The connecting-rod of the frame is placed eccentrically on a drum, working together with the other by means of a belt. A fly-wheel is generally added to regulate the speed of the frames. Two or three horse-power is required for each frame. The descent of the frame is also managed without the rope and counterpoise by employing cog-wheels and ratchets."

FLOATING KEROSENE RESERVOIRS.—The greater part of the petroleum and mineral oils intended for the consumption of Paris is stored in the docks of St. Ouen, where floating reservoirs, each of the approximate capacity of 100 barrels (*cuvées*) have long been in existence. The constant increase in the consumption made it necessary to enlarge the storage room, and 14 fixed reservoirs have recently been added, of a total capacity of about 900,000 gallons. They are of sheet iron, 28 feet in diameter by about 17 feet in height to the spring of the arched cover. The thickness of the bottom and of the lowest ring of plates is one-quarter of an inch and of the top rising 3-16 of an inch, while the thickness of the cover is only 1-10 of an inch. They are filled through openings at the top, three feet three inches in diameter, and, being all in one line, are connected by a bridge or footway, which extends from one extremity to the other, a distance of 420 feet. They rest upon a platform of wood laid upon a rubble foundation. The petroleum, when brought on shore from the vessels in the river, is at first deposited in the floating reservoirs, which are partly submerged. From these it is pumped into the newly-constructed reservoirs and thence drawn off through pipes into barrels. The total weight of the 14 wrought-iron reservoirs is 151 tons. Their cost was £3,080, or at the rate of £220 each.

PHOTOGRAPHING UPON WOVEN FABRICS.—Among recent applications for new patents is one for "improvements in photography relating to the production of photographic pictures on woven fabrics." Adverting to the matter the *Photographic News*, expresses itself as unable to discern difficulty in the productions of such prints in the ordinary way, and it cannot conceive why photographers do not take up more generally the matter of fabric printing. "Handkerchiefs, d'oyles, mats of all descriptions, surtvettes, fans, and a hundred other things of the kind might be ornamented or marked by the aid of photography. If a photographer could supply a set of d'oyles, impressed with the portraits of eminent persons—statesmen, artists, authors, actors, etc.—he would soon find customers for the novelty; in the same way, if he would undertake to mark a dozen handkerchiefs with the owner's portrait, or to ornament screens or mats with pictorial photographs of one kind or another, he would soon do a bit of business in such things. It might not lead to very extensive dealings, perhaps, but in these times it should be remembered, progress and novelty are the order of the day."

A MECHANICAL MUSEUM.—We read in the *Hartford Courant*, a description of an enterprise for an industrial museum lately undertaken in Connecticut. It is a part of the plan of the museum to have a permanent exhibit of the manufactures of the State, the Meriden Britannia company, the Whitney Arms company, and the potteries of Fair Haven and Elmwood having already contributed. The whole of the first floor is to be devoted to the manufactures of the State. The brass manufactures will occupy one room, the hardware and cutlery manufactures another, and for this room three of the leading concerns have already pledged their co-operation. The Willimantic Linen company is also preparing an exhibit.

ANNEALING METALS.—It is an interesting fact, says the *Iron Age*, that the annealing temperature of metals has never been exactly determined. All that is known about it is that there is a fixed and rather narrow range of elevated temperature peculiar to each metal, without the limits of which annealing does not take place, and that the absolute mean temperature for each metal seems to be greater in some proportion as the fusing temperature of the metal itself is higher. Plantina, when hard from wire drawing or lamination, is not annealed under an intense white heat; wrought iron at about a bright red, in some sorts not before a yellow heat; copper, at a low cherry red; and in case of metals of very ready fusibility, such as tin and lead, their annealing temperature appears to be so low that the heat evolved in them by conversion of mechanical force in laminating or wire drawing, is sufficient to keep them annealed, that is, they cannot be hardened by such processes. It is this curious fact that explains the well-known peculiarity in rolling sheet lead or "drawing" lead pipes by the older methods, namely, that the rolling or drawing can be accomplished by a loss total expenditure of power if performed fast than much more slowly.

RAIL CUTTING.—A simple contrivance, says the *Trade Journal*, has been adopted in some Russian and German rail-rolling mills, with a view to cutting the rails always of exactly the same length. The glowing rails are looked at through a dark glass; when they have cooled to a certain temperature, they can no longer be perceived. Using a dark-blue or orange-yellow glass, e. g., the rails may still be at a red glow, when the light radiated from them disappears in the dark glass. It may be considered that the light from two rails observed through the same dark glass disappears at the same temperature, and thus one is guided to cutting the rails while in this similar state, each rail after rolling being allowed to cool till it can no longer be seen at a given distance through the dark glass; thus they can all be cut of the same length. Of course the certainty of the observation is a little affected by variations in the general illumination (dark and bright weather, etc.), but glasses of various shades of color can be used according to the occasion.

GERMAN SILVER ALLOYS.—Edmund Kirk, in his writing for the *Iron Age*, gives the following: German silver is composed of 80 parts copper, 20 parts nickel and 33 parts zinc. The best quality of German silver is composed of 100 parts copper, 50 parts nickel and 50 parts zinc. The white copper, or packfong of the Chinese, which is the same as the German silver of the present day, is composed of 41 parts copper, 17 parts nickel, 13 parts zinc and two and a half parts iron. A very hard German silver is made of eight parts copper, four parts zinc, two parts nickel and one part iron. This alloy is very tenacious and ductile. A still harder German silver is made of 16 parts copper, eight parts zinc, four parts nickel and three parts iron. The finest quality of German silver that is made is composed of 16 parts copper, eight parts nickel and seven parts zinc. Ten parts copper shavings and four parts arsenic, arranged in a crucible in alternate layers, and covered with a layer of common salt, make a beautiful white alloy that is almost equal to silver. In making this alloy, care must be taken to avoid the fumes of the arsenic.

THE METRIC SYSTEM IN POST-OFFICES.—A writer for the *Polytechnic Review* makes this suggestion: To meet the difficulty pointed out by the Postmaster-General to the Committee of Congress in the way of introducing the metric system in the post-offices of the United States, let there be made for all the scales in the service, few in variety, a separate attachable scale-beam with the French system on it. Or, what is more simple, let there be new counterpoises, giving the right metric weights where used on the present scale-beams, he made for the various varieties of scales and sent out to replace the present counterpoises.

AGRICULTURAL IMPLEMENT EXHIBIT AT HAMBURG.—An international market of agricultural machinery and implements will be held at Hamburg this summer, commencing on the 13th and closing on the 17th of June. This promises to be a large and useful exhibit, and affords a good opportunity to show our agricultural implements in competition with those of England, France and Germany. Applications for space can be made up to the 20th of April, and full and careful preparations are being made to render the exhibition attractive and profitable.

IRON IN PENNSYLVANIA.—The *American Manufacturer* says: Pittsburg need not now complain, like some other portions of the country, of silent blast furnaces. There is now being more pig iron made here than ever there was. The two Lucy and the two Isabella furnaces are in blast, as are also the Clinton, the Soho, one of Shoenherger & Co.'s, and one of Jones & Laughlins'. These eight furnaces will produce about 4,000 tons per week, or about one-twelfth the product of the whole country.

DEATH OF A LEADING MANUFACTURER.—Mr. Henry Disston, of Philadelphia, recently died. Mr. Disston worked his way up from the position of a journeyman sawmaker to the proprietorship of the most extensive saw manufactory in this country and one of the largest in the world. The Disston saw is favorably known throughout the civilized world.

SCIENTIFIC PROGRESS.

A Laboratory on Ship Board.

An interesting subject, lately brought before the Chemical Society of London, was a description of the laboratory on board the *Challenger*, a vessel well known for its deep-sea dredging, etc. Mr. Buchanan said that the laboratory was 10 feet long, 5 feet 8 inches broad and 6 feet high, and although the dimensions seemed small, there was practically quite room enough for one worker. It was situated in the middle of the ship on the main deck, on the starboard, i. e., the right-hand side looking forwards. A locker, 2 feet 6 inches high and 2 feet broad, ran across the whole of the front side. Supposing that the visitor takes his seat on this locker looking aft, the following description will convey a rough idea of the interior: Immediately on his left is a gun port which, in the absence of the gun, provides light and ventilation for the room. Some light is also obtained from windows in the deck. The locker contains the stores of glass and porcelain, a balance, microscope, etc. On the right is the blow-pipe table; a spirit lamp, formed of a wide-mouthed stoppered bottle and having a large wick, which was found to yield the most convenient flame. A tallow lamp was abandoned on account of the trouble of melting the tallow. On the left-hand side, further aft, is seen the principal working bench, 3 feet 10 inches high, furnished with drawers containing the reagents, each bottle in a separate compartment. On the top of the bench battens are nailed, so that the bench presents the appearance of the frame of an ordinary door without the panels; into the places where the panels should be, the drawers of reagents can be fitted while in use, and so are prevented from shaking down. Ordinary retort stands were found to be useless, and the following stands were used: A half inch metal rod was taken, and a long eye cut out at one end (like a needle). Into this eye fitted a staple driven into the joists forming the roof of the laboratory. By this arrangement the retort rod had a certain play up and down. The retort rings having been slipped on from the bottom, the rod was lifted and then pushed down into a hole made for the purpose in the teak bench. This plan was found very convenient, and when not in use the rods were turned up, the eyes forming a joint, and hooked along the roof. For evaporating, drying, etc., a cast-iron frame set in gimhals and fixed to the side of the laboratory was found quite sufficient, even during the most violent movements of the ship. In the further left-hand corner are the sink and the diluted water vessel. Along the further end are wooden shelves with holes for various pieces of glass apparatus. Many vessels, etc., were slung from and between the beams supporting the deck. On the right-hand side are seen the bottles of standard solutions with hurettes; the latter made like pipettes, and filled by sucking up the solutions from below. In this way harium hydrate solution was found to keep its quality for two or three months, though used every day. On the same side the specific-gravity apparatus, hydrometers and piezometers were stored away. In all ordinary weathers, and, in fact, as long as the port which lighted and ventilated the laboratory could be kept open, there was no difficulty in working on board ship.

The New Crop of Planets.

According to a summary given by the *New York Independent*, the asteroids discovered in 1877 seem now to stand as follows (11 in all), viz.: 170, discovered Jan. 10, by Perrotin, at Toulouse. 171, " Jan. 13, " Borely, " Marseilles. 172, " Feb. 5, " Borely, " Marseilles. 173, " Aug. 2, " Borely, " Marseilles. 174, " Sept. 3, " Watson, " Ann Harbor. 175, " Oct. 1, " Watson, " Ann Harbor. 176, " Oct. 14, " Peters, " Clinton. 177, " Nov. 5, " Henry, " Paris. 178, " Nov. 6, " Palisa, " Pola. 179, " Nov. 11, " Watson, " Ann Harbor. 180, " Nov. 29, " Palisa, " Pola. There still remains a little doubt, however, as to one or two of them, whether they are not some of the older asteroids, which have been lost sight of for several years, and the question does not admit of summary settlement. Since the opening of the year the activity of observers has been very great, and already seven new discoveries are announced, viz.: 181, discovered Jan. 23, by Perrotin, at Toulouse. 182, " Feb. 2, " Gotscholt, " Marseilles. 183, " Feb. 6, " Peters, " Clinton. 184, " Feb. 7, " Palisa, " Pola. 185, " Feb. 8, " Palisa, " Pola. 186, " Mar. 1, " Palisa, " Pola. 187, " Mar. 3, " Peters, " Clinton. Of those, 181 is perhaps a rediscovery of Urda, No. 167; and 183 is quite probably identical with Antigone, 129, according to Mr. Hind.

THE YOUNG SCIENTIST.—This is the title of a new magazine for young people, published by the Industrial Publication Co., of New York. The price is 50 cents a year. It is a little publication calculated to call out and educate all the latent ingenuity and thirst for knowledge which the youthful mind possesses, and we hope it will win its way into every household in the land.

A PRIZE FOR MARS' MOONS.—At the annual meeting of the Paris Academy of Sciences, the Lalande prize in astronomy was given to Prof. Asaph Hall, of Washington, D. C., the discoverer of the satellites of Mars.

How Boulders Travel.

At a late meeting of the Edinburgh Geological Society, Mr. Milne-Home stated that, in the course of a recent visit to Islay, he discovered at Port Askaig a large mass of claystone rocks forming part of the coast of the Sound of Jura, which, on examination, was found to be filled with pebbles and large howlders of granite, of a kind not found in bulk nearer than the Ross of Mull, some 40 or 50 miles to the northward. An interesting question arose as to how these pebbles and howlders had been brought to Islay, across a stretch of sea attaining the depth of 150 fathoms. The epoch when this took place must go far back beyond the bowlder clay, seeing that the claystone rock seemed to have been the howlder clay of some period, which had become hardened. In Loch Ceran, an arm of Loch Linnhe, he found, on a bed of detritus, about 200 feet above the sea, some boulders of enormous size, consisting of a black granite, quite different from the gray granite of the neighborhood. The sharp points of the howlders were all turned toward the mouth of the loch; and this suggested the probability that they had been floated in. Looking at the bearings, he found that they pointed to the island of Mull, and he had since learned from Prof. Judd that they were identical with rocks found in that island. It thus appeared that Mull had very likely been a centre of distribution. Mr. Judd had discovered that it had been an immense volcanic island, and he estimated that the top of the crater must have been at one time 10,000 feet above the level of the sea, though now, owing to denudation, the mountains were not more than 2,000 feet high. The boulders found in Loch Ceran, on sand and gravel, must have been floated thither at a comparatively recent date. Those in the claystone of Islay must have been transported at a much earlier period; and it thus appeared that, during the epoch in question, there must have been in this part of the world a great current flowing from northwest to southeast, and conveying boulders on floating ice.

EVOLUTION AND SPONTANEOUS GENERATION.—Rev. W. H. Dallinger, who is well-known through his combat against the theory of spontaneous generation, lately delivered a lecture in London, on the relations between his theory and that of the evolutionists. According to the report in *Iron*, there were, he said, many admirers of the theory of evolution who held that unless spontaneous generation were admitted, the theory was incomplete. Just as in water there is the potentiality of forming crystalline patterns in snow and ice, so they hold that in organic matter generally there is the potentiality of forming protoplasm. No living structure contains any known element that is not met with in the inorganic world, and the only chemical difference known is the combination of the elements. But the lecturer urged that evolution and spontaneous generation were two distinct questions that need very accurate study apart. The developmental progression of all living forms from simple protoplasm is a very different question from whether living protoplasm can be spontaneously evolved from the inorganic world. For himself, if facts were brought forward to support spontaneous generation, he should be bound, were they valid facts, to accept the theory. He had, however, devoted much labor and the time of years to the rigid investigation of some of the facts that bear upon the question, and these he would describe. It had seemed to him, in studying what had been written, that there were two lines of work that needed following out very closely. One was a series of thermal experiments, to determine with exactness what is the "death point" of an organism, or a "germ." The other was to watch the life history of some forms of monads and see if they did reproduce. It was this second line he had taken up. The most carefully conducted experiments of the first groups have led to the conclusion that if all germs are excluded from septic liquids no life appears, while his experiments had conclusively shown that monads do reproduce from parental products, and the life history of successive generations had been watched. The natural inference seems to be that monads originate only from previously existing monads, and if this is true of them it is not improbable that observations conducted with equal care will show the same with regard to bacteria.

GLASS ENGRAVING BY ELECTRICITY.—M. Plante described at the last meeting of the Paris Academy of Sciences a new method of engraving glass by electricity. The surface of a plate of glass or crystal having been covered with a concentrated solution of nitrate of potash, and a horizontal platinum wire, connected with one of the poles of an electric battery, being placed in the liquid along the edges of the glass, any design may be easily drawn on the glass by touching it with the point at the other end of the platinum wire. The wire forming the "pencil" is insulated, the tip alone remaining uncovered, and by simply using the wire as an ordinary pencil and tracing imaginary lines on the surface of the glass, the design is permanently reproduced and distinctly engraved thereon. Flat surfaces may be easily treated in this manner, but the difficulty of keeping convex surfaces covered with the nitrate of potash is likely to prove an obstacle to the general adoption of the system. By means of a specially constructed bath, however, it may be possible to overcome the difficulty.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

ITEMS.—*Chronicle*, March 23: The Double Standard company, lately incorporated in San Francisco, have purchased the Schenectady mine and mill, at Monitor, and commenced work. This is a live company and have a valuable property. The personal property of the English company was sold yesterday and brought good prices. The sale of the mine has been postponed till April 25th.

AMADOR.

ABOUT SUTTER CREEK.—*Ledger*, March 30: Business is reviving in Sutter Creek, and the prospect for a good trade is excellent. The Gover mine and mill employ at present about 60 men men; the Bunker Hill, under the same management, 30; and the Lincoln, 75.

IONE VALLEY coal has been tried on the California and Oregon railroad with poor success. The train lost six hours on one occasion between Reading and Sacramento, owing to the inferior quality of the coal for producing steam.

RUSSEL HILL.—*Dispatch*, March 30: Plenty of water and times are lively here, there being at least 30 hydraulic claims running within six miles of the place, besides several quartz claims and mining operations of lesser magnitude, all seemingly doing well.

BUTTE.

THE HYDRAULIC ELEVATOR.—*Mercury*, March 29: This machine is operating with entire success in the Wyandotte gravel mine, which, although very rich in gold, could not be worked heretofore for lack of fall. With a good head of water the gravel is pushed through the pipe with great force, and, with this improvement, it is evident that there are hundreds of acres of gravel in Butte county that can be made to pay well for working, but which, without this aid, could never have been handled at all.

CALAVERAS.

DEALING WITH THE HARD CEMENT.—*Citizen*, March 30: Many of the hydraulic mines of this county, after having been successfully worked for a number of years, have ceased operations and are now idle, owing to the appearance of a layer of hard cement. Mr. Doyer, the inventor of a machine by which hard gravel or cement can be rapidly and thoroughly washed, is now here examining this material with a view to trying his invention upon it. This machine is made of steel rails resembling in shape the letter T and arranged so as to form a cylinder, 30 feet in length and six feet in diameter. By the application of steam power it is made to revolve rapidly, while the gravel or cement is forced into it and torn to pieces by coming in contact with the rails. The fine gravel falls through the openings in the cylinder and is caught by an apron which conducts it into a sluice. Should this invention prove a success and do what is claimed for it, work can be resumed upon these claims and a new impetus will be given to our mining industry.

EL DORADO.

Mountain Democrat, March 30: Hoisting works are going up on the Keegan mine—ore looks fine. One bucket of ore from the Stuck-slager mine yielded \$1,200 clean gold. The extensive new flume at the Placerville hydraulic claim is completed, and work there resumed. The ditches of the El Dorado Deep Gravel and Water Co. are running full, and scarcely anything can occur to defeat a long season of prosperity for this company.

INYO.

DEFIANCE.—*Independent*, March 23: Furnaces running steadily, with perfect success, and a prospect ahead of continuing to do so indefinitely. In the 24 hours beginning Wednesday morning last there were run out 27,500 pounds of hullion.

REX MONTIS shipped on the 20th two bars of bullion, weighing 152½ pounds, valued at \$2,000—result of the first clean-up from the run now being made on tailings.

MONO.

LOCAL MINING NEWS.—*Bodie Standard*, March 27: On all the ledges of the Bodie chain work has been pressed vigorously during the week. In each utmost confidence is expressed by the owners, and the progress that is made is wonderful, considering all circumstances. Every mine from the Syndicate tunnel on the north to Queen Bee hill on the south is progressing to the great objective point—the development of the lode. With such incentives and objects in view it will not be many months before Bodie and its mines will prove there is something more in it and them than mere croppings.

OUR LIVE MINES.—First in this category is, of course, the Standard, now developed to a depth of 650 feet, with large reserves of fine ore opened up, mills running, and extracting the usual amount of hullion. On the Bodie, Black Hawk, Bechtel, Red Cloud, and several others, work is being actively pushed, the outlook for the camp being in all respects highly encouraging.

NEVADA.

GOOD ORE.—*Transcript*, March 31: John Schmidt recently cleaned up a crushing of ore that went \$67 per ton, value of sulphurets in-

cluded. The latter are shown by fire assay to be worth \$576.98 per ton.

HYDRAULICS.—Some delay has been caused at a few of the claims by the flumes and sluice boxes being washed away by the high water. These and other minor injuries are now repaired and work is everywhere being rushed with the hydraulic miners.

SARGENT & JACOBS' gravel claims are both in full blast, and a large force of men are working them for all they are worth. Never before have these mines given their owners assurance of such good results as at present, and it is thought this season's work will profit them much more than has been realized therefrom for several years past.

QUARTZ MINES.—Some of the mills in the upper part of the county will not commence crushing for some time yet, the water being too cold for successful amalgamation. The last crushing of ore from the Rocky Bar mine, located near Grass Valley, was 110 loads, which yielded at the rate of \$54 per load, including sulphurets, or within a fraction of \$6,000. Robert M. Fryer, it is expected, will be in the city to-day, and immediately take steps for beginning work under the auspices of the recently organized mining incorporation to which he belongs. The indications of this company's claims, which are located on Gold flat, are held to be equal to any in this section, with the exception, perhaps, of the Providence bonanza. A short time will serve to substantiate this statement, we believe.

PLACER.

CLEANING UP.—*Herald*, March 30: A number of the hydraulic mines in Placer have made one run and had a clean-up, and from this time on to the close of the mining season cleaning up in one mine or another will be an every day occurrence. (The Baker claim at Dutch Flat cleaned up recently, and from about nine days' washing they realized \$5,000, three-fifths of which will be clear profit.) Breece & Wheeler's famous claim, at Bath, has made one clean-up, the exact result of which we have not been able to learn, though it is understood to have been very satisfactory. This mine in the past has generally panned out, in an average run, from \$25,000 to \$30,000, and it is likely their last clean-up was not far from this result. McGilvrey, of the Dardanelles and Oro claims, at Forest Hill, where they are and have been running two pipes night and day since the commencement of the water season, has also made a clean-up with, we understand, encouraging results. In these claims a blast was fired last week of 11,000 pounds of Judson powder, which is said to have three times the explosive force of common black powder. Its effect, was effectual and satisfactory.

PLUMAS.

GREENVILLE AND VICINITY.—*National*, March 23: The Green Mountain mills are running up to their full capacity on \$12 rock. The Indian Valley mine has been retimbered, and work upon it will be started up soon. Mexican mine, North canyon, still running main tunnel and opening up a fine body of ore; talk of erecting an eight-stamp mill in the spring. Everything running nicely at Rush creek. The Long Valley reservoir is full of water, and the Providence Hill mines intend starting up work immediately. Messrs. Whitlock & Treleven intend starting the New York mill the first of next month. The Gold Stripe mill at Wolf creek still continues running on good ore. The characteristics of the mine are similar in every respect to the celebrated Standard mine of Mono county.

SHASTA.

MINING ITEMS.—*Independent*, March 28: We have very flattering accounts from the late discovery on Flat creek. The ledge has been located for several miles on the original discovery and proves to be very rich in gold. They are sinking and have found the ledge about two feet wide and free gold as far down as they went.

AT COPPER CITY they are driving ahead, and have sent up most of the machinery for the quartz mill; will have a silver brick within 60 days.

THE AFTERTHOUGHT will commence running again in a few days, as they are all ready to fire up. The other claims in the district look well and will all be at work soon.

BUCKEYE.—This is a lively and prosperous camp, no Chinaman being allowed to stop in it, nor are they allowed to mine anywhere on that side of the Sacramento river. This has been the case for a good many years, and the result is many white men find employment and make good pay. Several attempts were made by white men some years ago to introduce Chinamen over there as miners, but they were politely waited upon, and the Mongolians departed hastily, and we don't think the man would last over 24 hours, who persistently employed them even at this late day. The miners have done a great deal of work this winter and will make a good clean-up at the end of the run.

SIERRA.

ABOUT FOREST CITY.—*Mountain Messenger*, March 31: Wm. McDougal, Superintendent of the North Fork, took \$6.50 from a breast in that mine with his candlestick a few days since. This company have excellent gravel in sight which they have commenced taking out. They now employ 45 men, which number will be increased as soon as sufficient ground is opened.

BRUSH CREEK.—The water was pumped out of this mine on Sunday last. The work of taking out rock will soon be commenced.

SIERRA CITY.—Most of the men who were idle here for some time past from want of water, are now at work making lively times. Moore

& Co., on the ridge between Howard's ravine and Sardine lake, are busily driving their tunnel, with the expectation of soon striking a rich channel. Hihherd & Darling have finished their drain tunnel, and are now at work on an incline. Prospects good. If these ventures succeed, as they no doubt will, more life will be infused into the mercantile affairs of Sierra City than it has known for years. More prospecting, too, will be done this season along the river between here and Downieville than for a long time past.

TRINITY.

LOWER TRINITY.—*Journal*, March 30: Miners generally are doing well, but some have met with accidents which have caused much delay. Forty lengths of Boyce & Redington's flume fell down, and, as it cannot be repaired until the storm ceases, they are out of water at the mine. The China Flat boys are in good spirits. Coffin & Silkwood are doing good work.

A PAYING CLAIM.—Peter P. Black opened a hydraulic mine, this winter, on Canyon creek, about two miles above Ahren's place, which is paying well. Black has plenty of dump and pressure and the mine is rigged in good style.

GOOD CLEAN-UP.—Smith & Lowden, on Carter Bar, made a clean-up last week, realizing \$1,000 from a run of 10 days.

IDLE MEN are unknown just now in all the regions round about this locality. Every one has something to do and it is being done.

TUOLUMNE.

ABOUT COLUMBIA.—*Independent*, March 30: The Philadelphia gravel mine, 12 miles north-easterly from Columbia, is turning out big. The company have been engaged in washing with their giants during the past month with encouraging results. This claim is located on one of the most extensive deposits of auriferous gravel in the county. The outlook for Tuolumne is much more encouraging than for many years past, owing to the introduction of late into the county improved mining machinery, by which prospecting and mining operations in every branch are facilitated, thereby greatly reducing the expenses of working and rapidly developing new and rich mines throughout the various districts. In Columbia and vicinity it is to be noticed that old diggings are being purchased and abandoned diggings reclaimed by the Chinese. The miners in the Ferguson have come upon a \$15,000 strike in a new chute that has never been worked.

Nevada.

BELMONT DISTRICT.

AT THE EL DORADO South they have just commenced raising ore. The car samples average over \$300 per ton. At the Belmont they have in the neighborhood of 200 tons of ore on the dumps and in the ore-house that will mill over \$100 per ton, and between the 200 and 300 foot levels some 500 tons of the same quality ready for stopping.

CHERRY CREEK DISTRICT.

PROGRESS OF THE CAMP.—*Independent*, March 23: The Star company shipped, during the present week, 14 bars of bullion, valued at \$10,000. The Bonanza company, at Ruby hill, are pushing their north drift actively and are now taking out ore, the lowest assays of which are \$1,200 per ton; expect to have it worked at the Geneva mill. The Mary Ann company have at present two shifts at work and a tunnel driven in some 45 feet. Some ore has been found that assayed from \$40 to \$45 per ton. The prospects are very good for extensive developments in this mine in the near future, should work be continued.

ELY DISTRICT.

WORK IN PROGRESS.—*Pioche Record*, March 23: The Alps mine shows a manifest improvement during the past week. The Day mine turns out 10 tons of ore every 24 hours, battery sample of which assay \$160 per ton. It is being successfully worked by the mill process. Work progresses on the Hillside, the Mayflower and the Tempest. Raymond & Ely are pumping steadily, and raising the water. The reopening of the old levels is progressing. They are finding ore and have very favorable prospects. The 30-stamp mill is running on tailings and Day ore.

EUREKA DISTRICT.

BIG RUN.—*Sentinel*, March 30: The largest furnace run ever made in this camp was that of the Richmond works on Monday last, three furnaces turning out a trifle over 54 tons of crude hullion, or an average of 18 tons each. The ore now being reduced from the mine are very rich in lead, yielding from 35% to 40% of that metal.

EUREKA CON.—There is a report that this company have come thought of removing their furnaces to Ruby Hill, the site of their mine. If this is done two additional furnaces will be put up. They have now about 350 men on their pay roll.

OTHER MINES.—The daily hullion output of the K K mine is something over eight tons. From 15 to 20 car-loads of refined lead and crude hullion are shipped from Eureka for Palisades every day. The Connolly mine is yielding handsomely, and large quantities of ore are shipped to the Richmond works daily. There are now 1,270 men employed in and about the mines and furnaces in the Eureka district.

GALENA DISTRICT.

NEW FURNACES.—*Battle Mountain Messenger*, March 30: The two new furnaces for the White and Shiloh company's mines, at Galena, are in full blast and working splendidly, so much so that the Superintendent, C. L. Strong,

is determined to have the third one soon in operation. The calculations are to put on more men in the mines, which are looking very promising, and we may expect good results from the old camp the coming season.

MINERAL HILL DISTRICT.

DULL.—Business here is exceedingly dull, very little mining now being done except by the English company.

REESE RIVER DISTRICT.

MANHATTAN.—*Reveille*, March 30: The mill reduced during the week ending yesterday morning, 134 tons, 1,216 pounds of ore. The condition of the Manhattan mines was never better than at present, nor have they ever before shown greater signs of permanence or contained larger or better bodies of ore.

WARD DISTRICT.

MARTIN WHITE COMPANY.—*Reflex*, March 23: The furnaces have been taken down to put in new water jackets, an overhauling of the works generally being in progress. Will start up again about the 15th of April, after which they will be able to run through ore at a cost of \$20 per ton, the cost before the present Superintendent, Mr. T. H. Selby, took charge having been \$40. Since he took charge, October 15th, to the time of shutting down, March 3d—a run of 140 days—the books show as follows:

Assay value in silver of material reduced	\$304,500.57
Silver shipped	\$255,312.20
Silver in matte on hand	\$17,000.00
Silver in lead on hand	1,650.00
Silver in fine dust	3,900.00
Loss in silver	16,698.37
Total	\$304,500.57

Thus it will be seen that out of the assay value of ore put through the furnaces the sum of \$265,312.20 has been shipped in fine silver hullion, and only \$16,698.37 actually lost. In reducing that remaining in matte, lead and fine dust, the loss cannot be great, which is hy no means a bad showing. The ore put through has been worked up to a high per cent. In addition to the above the same silver hullion contained \$14,305.33 in gold, which, when added to the silver, would bring the amount actually shipped up to \$279,617.53, or about \$2,000 a day since October 15th up to and including March 3d.

Arizona.

HUMBURG.—*Enterprise*, March 23: New mill running and giving satisfaction. The company have commenced doing a little custom work to the great relief of the miners. No new discoveries reported in the district, but the ledges are widening and growing richer the deeper they are tested.

MIAMI.—*Sentinel*, March 30: Sixteen hundred dollars in silver bars came in on Sunday from the new Miami mill. This is their first shipment of hullion to come under our notice.

SILVER KING CONCENTRATIONS.—Barnett's train arrived on Monday with 36,000 pounds Silver King concentrations and 4,000 of Belcher ore. He left Pinal on the morning of March 10th, and his load was aboard the cars here on the afternoon of the 25th, a remarkably quick trip. On the 25th this company made another shipment of 20,000 pounds of concentrations, assaying 2,200 ounces of silver per ton.

RIVERSIDE.—Concerning this camp, a correspondent of the *Citizen* writes as follows: Parties have been here from San Francisco and purchased one-half of the water right of Riverside, with the intention of putting up reduction works, and ere long the noise of busy stamps will be heard among the hills for miles around, making the scene one of life and interest. There will be water power enough for from 100 to 200 stamps. Ores from the Silver King, Silver Bell and other mines in Pioneer district, can be reduced here for one-half the expense that they can be in their immediate vicinity, for wood is scarce there, and if it were not, steam could never compete with water power for the working of ores. The road is located from Riverside to Pickett Post and neighborhood, and teams that bring ore to the river can have timber for the mines of that district as hack freight, which will be brought down from the Pinal summit by the time the mills are in successful operation. The road to the timber has been located by Charles D. Putnam. Fine timber can be had in the Pinal for considerable less than it can be brought for from the vicinity of Prescott and elsewhere. Pickett Post is 16 miles from here. The King mine is about the same distance. There can be a fine road made up Mineral creek, with but few hills and they won't amount to much. The timber in the Pinals is 20 miles from here and altogether about 36 miles from Pickett Post and Kink mine. The mines of Summit district and Mineral creek are developing faster than for some time past. The Pioneer mine is bonded for \$75,000. It shows a large body of ore. It lies 15 miles from the river. The Ida Ingles has lately been purchased by Mr. Thompson, of Oakland, Cal., for \$20,000. He is well pleased with his purchase, and says he would not take four times the amount he paid for it. Other developments are going on, which look promising. Some very good prospects are found near Cane Springs, and locations are being made in most every direction, and if one-fourth prove good, Riverside will in time be quite a mining center.

THE PECK MINE AND MILL.—*Enterprise*, March 27: The mill of this company carries 10 stamps and is provided with all necessary appliances, such as driving machinery, pans, settlers, roaster, etc. Owing to want of water, it is now being run but half the time. It is a very substantial structure and cost the company between \$70,000 and \$90,000. It is located on

on the west bank of War Eagle creek, near the tunnels and shafts of the mine. War Eagle is now almost dry, so that this mill is supplied with water from a shaft in this vicinity. This Peck mine, which was discovered in 1875 by Edmund G. Peck, is without doubt the richest and most promising mine yet opened in this section of Arizona. It is opened by two long tunnels—one about 600 the other about 900 feet in length, by several open cuts; three or four winzes and a shaft over 400 feet below the level of War Eagle gulch. The ores already taken out have yielded over \$400,000, and the mine is just scratched on the surface. It has built up a village of about 500 inhabitants and 100 houses; been the means of opening up a large extent of country, kept owners, lawyers and others in pocket change and proved to the world that Arizona is what we have always represented her to be. Under the new management additional stopes will be started, the deep shaft will be put down deeper, the mill will, if possible, be run all the time, so that the yield of bullion will, from this on, be much greater than in the past. A whim, to aid in sinking the shaft, to hoist water, etc., will soon be running.

Colorado.

GEORGETOWN.—*Denver Tribune*, March 27: The mines in Clear Creek county continue to yield rich ores and the prospects for the present year are excellent. The new town of Swansea, four miles south of Georgetown, will soon figure as a mining center. The town of Empires is enjoying a mining revival. Large quantities of ore are being shipped from the 10th Legion lode to Golden for treatment. There is no reason why this almost forgotten camp should not be as prosperous as the best mining camp in Gilpin county. Lawson is to have sampling works.

BOWLER.—The owners of the Golden Age mine continue to accumulate their golden retorts, and are doing their best for the cause of inflation. Mr. Neikirk sold over \$10,000 worth of ore as the yield of the Melvina lode for the month of February. Four-fifths of that is reported as clear profit. At Ward, the Celestial lode, one of the old and rich lodes of that camp, has just shown up a hidden treasure in the shape of a two-foot vein of stamp ore that runs from 12 to 16 ounces of gold per cord. Mr. Rouse has rented Wood's mill, on Four-Mile creek, and is preparing for custom work on concentrating ores. He is taking out the Erbe belts and putting in the Pomeroy tables. Chris. Ostid's furnace, one of the process discoveries, made a trial test yesterday, which was witnessed by several gentlemen, none of whom were experts in the metallurgical line. The result, like Omnipotent purposes, is undiscovered and undiscoverable. Leadville is attracting attention here, and there is considerable immigration to that point.

Idaho.

World, March 26: A large force of men will be put to work on the Wolverine in a short time. Messrs. T. S. Harris and Wiley Fox are taking home very rich rock from their ledge in Eldorado gulch, Gambrinus district. Messrs. Green, Martin, and Hallett are still at work on their ledge at Henry creek. In running for the pay chute they had proceeded but a short distance with their tunnel when they struck a bulge in the ledge and found it to be rich 20 feet below the surface. Only a small prospect was found in the croppings. The Granite Creek Ditch Company have water through their ditch and will commence mining in a few days.

Montana.

PHILLIPSBURO.—*Butte Miner*, March 19: The Northwestern company's mill turned out 27,752 ounces of fine silver, worth \$31,082.24 during the month of February, running 25 days. All the openings of the Trout mine are turning out ore of excellent quality, the most valuable coming from the 330 level, which, in addition to native silver, argentiferous blende, galena and copper pyrites, contains a very large percentage of ruby silver, choice samples of which go as high as 1,000 ounces of silver to the ton.

PHILLIPSBURO ITEMS.—*New Northwest*, March 22: The mills of this place are reaping the reward of able and honest management—the wages of which is prosperity to themselves and to all in our community. I venture to say that not even in Butte do the same number of stamps produce better results. Further, I will hazard the assertion that nowhere in the mountains are ores containing the base metals of the Trout mine worked to as high a per cent. with as little cost as at the Trout mill, saving from 90% to 94%. They are now taking out ore never before equaled in richness or beauty. The Algonquin have their new pump running. It has a capacity to keep the mine drained to a depth of 1,000 feet. The water is cleared from the mine, a full crew of men are at work, and everything is lovely. Holland & Estell are working their Salmon lode, and taking out first-class ore. This mine improves in richness as they go down. The same of the Sharktown lode, owned and worked by Murray & Durfee. A 10-stamp mill on each of these lodes would double the amount of bullion produced here. Peter Coyle has struck it rich on a lead owned by him. Waterbury, the Brown boys and J. K. Pardee are in raptures over their camp on the Boulder, and with a mill to back their assertions, will give odds in favor of no camp in the Territory. You will rejoice with the friends of Doc Merrill and George Kidder over their rich find. They have four feet between the walls, solid ore, no waste, and running up into the thousands. George Mason is working on a gold

lead in Georgetown with good pay in view. He has lately bought out his partner, Doro Aiken. We are informed the owners of the Smoke House lead, at Butte, which runs due east and west, passing under the Silver Butte saloon and Hauswirth's corner, are having it surveyed, with a view to applying for a patent. The Penobscot lode, from which Mr. Vestal is making such good products of gold, lies in Deer Lodge county; the Snow Drift, an extension of the same lead, lies in Lewis and Clarke counties. The lode crosses the summit of the main range. It is about seven miles from H. S. Clark's old station, "Greenwood," on the Blackfoot and Helena road, and this is some four or five miles from "the Frenchwoman's." A road will undoubtedly be opened from Clark's to the Penobscot this summer. A considerable number of men are preparing to prospect there for other leads, and from what we learn the possibilities are very fair for the striking of other leads. The ore does not crop out as at Butte, and parties finding leads will have to dig for the vein.

New Mexico.

GEORGETOWN.—*Grant County Herald*, March 16: The shaft on the McGregor mine is down 85 feet, with good prospects; that on the Satisfaction is down 100 feet, the ore improving steadily from the surface down. Some 40 tons of this McGregor ore has been taken to Silver City for reduction. Lessors and miners are generally doing well. The mines here pay their own way, there never having been a dollar of outside capital expended upon them. The timers are out for a new mill, which will be in operation by June.

Oregon.

BIO NUOBER.—*Sentinel*, March 27: On Saturday last Martin Koster, of Foothills creek found a nugget in his claim weighing three and a half pounds, worth about \$700. The day previous he found a piece worth over \$42.

ESTHER MINE.—The parties in charge have made one small run on quartz, with satisfactory results. The mill is now engaged in running the tailings through the pans. They are making arrangements to have quartz taken out so soon as the roads can be traveled over, thus keeping the mill steadily at work.

OUR GOLD PRODUCE.—C. C. Beckman has handled over \$10,000,000 in gold-dust during his 25 years' residence in this place, and estimates that as much more passed through the hands of other buyers. This enormous amount of bullion was the product of the mines of Jackson and Josephine counties, which still furnish a great stretch of mining ground that has never been worked and only awaits the introduction of capital to make it yield forth its golden treasure. Hydraulic mining is destined to be one of the leading industries of southern Oregon, and a very remunerative one, too.

A PROSPEROUS SEASON.—The mining industry of Jackson county has not been so prosperous for years as at this season. The abundant winter rains and the melting snows in the mountains keep the creeks and gulches full, affording enough water for all practical purposes, "and some to spare." The mines on the two Applegate and the various creeks and gulches are all being successfully worked, and considerable of the "precious" taken out. Farming in the valley is also taking a new start and promises to become remunerative. This, with the people learning and practicing habits of economy, is a sure indication of the ushering in of an era of prosperity for southern Oregon.

Utah.

VARIOUS MINES.—*Salt Lake Tribune*, March 30: Walker Bro.'s have received from Butte, nine bars of bullion, valued at \$22,629.72. Four bars of bullion, valued at \$7,211.91, were brought down from the Ontario yesterday. The Waterman smelter started again yesterday on Hidden Treasure ore. Placer miners no longer complain of the scarcity of water in Bingham, and the mines will pan out big this season. The fame of Horn Silver mine is attracting the attention of capitalists to Beaver county. The Grossbeck is now free from incumbrance and worked vigorously would easily produce a \$1,000,000 the present summer.

METEOROLOGICAL SUMMARY FOR MARCH.—The report of the U. S. Signal Service officer, of San Francisco, for the month of March is summarized as follows: The mean height of barometer for the month was 30.11; mean temperature, 55° 6; mean humidity, 75.61; prevailing winds, southwest; highest barometer, 30.3; lowest, 29.4; highest temperature, 66°; lowest, 46°; monthly range, 20°; greatest velocity of wind, 24 miles per hour; total number of miles traveled by wind, 5,456; total rainfall, 4.56 inches. Rainfall in March during former years: 1872, 1.59 inches; 1873, .78 inches; 1874, 3.36 inches; 1875, 1.30 inches; 1876, 5.49 inches; 1877, 1.08 inches.

THE police of this city seized on Tuesday last, a large quantity of bogus shares of Ophir stock, just as they came from the hand of the lithographer. They were well executed, but were still in blank, none of them having yet been disposed of. George W. Crawford was arrested in connection with the affair.

AN icicle, weighing two tons and a half, in the Chollar-Norcross shaft, Virginia City, is causing great fear to the miners. It is hanging from the nose of a bob, 250 feet from the surface, and should it break loose, will fall 1,700 feet, crushing everything in its way.

News in Brief.

It is claimed that the Montana mines have produced \$100,000,000.

The public debt was decreased during March, \$2,313,614.

A dog show opened in Boston on Tuesday with about 700 entries.

It is reported in Rome that the Jesuits are opposing the Pope's general policy.

GENERAL ANDERSON, of the Louisiana Returning Board, has been released.

The "patriots" in New York declare that the Cuban war shall not end.

The Quaker meeting-houses in New York are entirely free from debt.

LONDON special says that the Czar has ordered 500 additional Krupp guns.

LEGAL TENDERS are firm in San Francisco at 98½ and 99 buying and 99½ selling.

The famine in the northern provinces of China continues with increasing severity.

The letter carriers collected in this city in March 551,913 letters and distributed 448,692.

OPERATIVES at Fall River are urging the manufacturers to reduce the hours of labor instead of wages.

A CAPE TOWN dispatch says: "There is every prospect of an early close of the war. The Kaffirs say they are tired of it."

CAPTAIN BOGARDUS, the famous string shot, sails for Europe June 1st. He has challenged all Europe for pigeon shooting.

ONE hundred and fifty-eight license marriages were issued last month by the County Clerk of San Francisco.

THE Indians at Chemamus, forty miles north of Victoria, have resisted the authorities, and a gunboat has been sent up.

THE ship *P. R. Hasoline*, from New York for San Francisco, was wrecked off Cape Horn. A part of the crew were saved.

ONE hundred California ministers who have been interviewed, express doubts about a state of future punishment.

DURING the past week 95 deaths occurred in San Francisco, of which 17 were from consumption.

THE total rainfall in this city for the year ending March 31st was 34 inches. At the same time in 1877 it was 10.59, and in 1876, 29.62.

ARCHITECTS in Oakland report an unusually large number of plans under way for the coming building season.

SOME of the farmers on the Arroyo Grande, San Luis Obispo, are running mowers over their fields of grain to check the rank growth.

FROM three to 10 car-loads of beef cattle are shipped to San Francisco, every few days, from Winnemucca, Nevada.

THE Coroner's inquest has found that the loss of the *Eurydice* was accidental, no blame attaching to anybody.

THE notorious Major Bonner has given up his eldership at Salt Lake and left for parts unknown.

AT Tiflis the Sanitary Commission found 20,000 corpse buried two feet under the ground, frozen but not decomposed.

THE Murphy movement is flourishing in Los Angeles, over 500 signatures to the pledge having been obtained there last week.

GREAT dissatisfaction exist in Texas over the report of the Commissioner appointed to investigate the El Paso and San Elizario difficulties.

THE Cowlitz pass of the Cascades is to be surveyed, to see if a practical route for the Northern Pacific railroad can be discovered.

CAPT. LEES last Thursday obtained \$3,940, which had been "planted" by George W. Abbott. Thus far all but \$6,000 of the \$40,000 obtained by Abbott has been recovered.

THE iron trade of South Yorkshire, England, is in a most stagnant condition, and large numbers of men have been thrown out of employment during the past few days.

It is understood in Rome, that the foreign policy of the new Italian government will be that of strict neutrality on the Eastern question.

THE bill establishing the office of State Engineer, and appropriating \$100,000 for irrigation and mining debris investigation, has become a law.

THE train bearing the remains of Mark Hopkins made the continuous run from Yuma to the end of Long Wharf, a distance of 720 miles, in about twenty-six hours.

A MRS HOWARD, of Boston, has reared nearly to full growth, an African lion and lioness, which run about the house and are as playful and harmless as young dogs.

IN two artesian wells being bored at Battle Mountain, Nevada, flowing water of excellent quality has been obtained at a depth respectively of 105 and 110 feet.

THE embargo on the Costa Rican man-of-war *Yaracuy*, formerly the steamer *Pelican*, having been raised, she left on Wednesday last for the South.

A PROCLAMATION, signed by Gen. Martinez Campos, declaring peace re-established in Cuba, and pardoning all persons for treason, rebellion and sedition, has been published.

THE House Committee on Education have agreed to report favorably upon the bill to provide a fund of \$250,000 in United States bonds, the interest on which is to be expended for the benefit of institutions engaged in the education of the blind.

COLONEL TOM SCOTT testifies that the loss of property of the Pennsylvania Railroad Company, in the July riots, was \$2,000,000, while the entire loss, including merchandise, etc., is estimated at \$5,000,000.

THIRTY-ONE persons were committed to the Napa Insane Asylum last month from this city.

HARRY HILL has found a man whom he is willing to hack for any amount from \$500 to \$1,000 to heat the time made by O'Leary.

THE severest hail storm ever known in that section, visited Calaveras and Tuolumne counties a week ago last Sunday; most of the hailstones were as large as ordinary marbles.

THE insurance companies in Panama refuse to insure unless an improvement in the matter of water is effected. The Panama railroad is negotiating to supply the town.

THE bill introduced into the California Legislature for regulating transactions in the Stock Exchange Boards and the management of mines has been defeated.

DENNIS DONNELLY, a Molly Maguire, will be executed at Pottsville, Pa., on the 18th inst., at which time and place Jack Kehoe will also suffer death.

No more goods will be received at the Brooklyn Navy Yard for shipment to the Paris Exposition. Twelve hundred tons await transportation.

THE Pound Keeper reports 414 dogs lassoed last month, and thirty mors on hand March 1st. He killed 216, 44 were redeemed, and 12 were sold. The total receipts for March were \$146.

TWENTY-SEVEN States now receive from the United States Fish commissioners fish eggs for hatching in their respective waters. About four billion eggs of California salmon were distributed by the Commissioners last October.

MRS. SARAH BERNIS, aged 30 years, committed suicide by hanging, last Tuesday, at her residence, near Petaluma. She had been dependent for some time by reason of the death of a sister.

ABOUT thirty States have received their standard setting forth the metric system of weights and measures, which is now being introduced. These standards are to be placed on exhibition in some public place accessible for reference.

THE followers of modern Spiritualism in California concluded their celebration of its thirty-first anniversary at Charter Oak Hall on Sunday last.

THE last labor demonstration in Canada took the novel form of an application to the Government for the loan of money enough to establish the malcontents on farms of their own in Manitoba.

A WEEK ago a girl, aged 17 years, tried to drown herself in the stagnant, filthy pool at the corner of Florida and Nineteenth streets, in the southern part of this city. She was rescued, and, on examination, being found to be insane, was sent to the lunatic asylum.

ON the 28th ult., E. J. Pitts and Alfred P. Thorne, having had some trouble about business matters, met on the street in Eastville, Va., and, renewing the difficulty, commenced firing on each other with pistols at six feet. Pitts was shot through the heart and died instantly and Thorne fell fatally wounded with a ball in the neck.

THE estate of the late Mark Hopkins is valued at \$15,000,000, which, as he died intestate, will be divided equally between his widow and adopted son, if it shall appear that all the formalities required by law to render the act of adoption regular have been complied with.

SOME three months since, a Chinaman, employed by a Mr. Maynard, in this city, stole from that gentleman \$350 and some mining stock, but such was Mr. Maynard's confidence in the honesty of his domestic that he refused to prosecute him. Soon afterwards John stole \$80 more from the same party and immediately disappeared. A day or two since the fellow was found and taken in by the police and Mr. Maynard will now go for him.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

RATTLEBORN CO.—April 2. Location: Dakota Territory. Capital stock, \$10,000,000. Directors—George D. Roberts, W. H. Sharp, J. H. Crossman, S. Buckley, E. M. Hall.

HAVILAH CON. G. M. CO.—March 2. Location: California. Capital stock, \$10,000,000. Directors—J. B. Haggin, D. L. Reese, J. C. Bell, W. B. Carr, L. T. Haggin.

PEARL G. & S. M. CO.—March 3. Location: Nevada. Capital stock, \$10,000,000. Directors—Eben P. Terry, Edward B. Patridge, A. B. Hinckley, John L. Murphy and Henry Walters.

ATLANTA M. CO.—March 26th. Directors—A. F. McGrew, Adolphus H. Noon, Lewie Smith, Charles Athearn and Antonio Peter Troy.

LEWIS CON. S. M. CO.—March 26th. Capital stock, \$6,000,000. Directors—W. H. Bluet, J. O. B. Gunn, J. W. Pew, W. H. Booth and W. L. Hopkins.

ORION M. CO.—March 27th. Capital stock, \$270,000. Directors—B. B. Hill, E. G. Spencer, C. F. Macy, H. C. Ladd, W. H. Seaman, J. C. Dessonslavay and P. Conklin.

GRASS VALLEY G. M. CO.—March 27th. Capital stock, \$60,000. Directors—James Bernallock, Samuel Granger, Maurice Dore, P. J. White, J. Devlin and D. L. McDonald.

THE Pacific Dredging and Mining Company has incorporated, with \$5,000,000 capital stock, for the purpose of "dredging and levee building and general mining in the Pacific States and Territories."

THE ENGINEER.

PROGRESS IN NEW YORK PROJECTS.—The *Iron Age* gives the following notes of progress in enterprises which we have heretofore described: Respecting the Hudson river tunnel, Col. D. C. Haskin, who is looked upon as the prime mover in this enterprise, remarked a day or two ago to our reporter that they expected to be able to speak definitely in a few days of the prospects of the work. He denied that the undertaking was in any sense abandoned. The intention is to go forward as soon as practicable. A movement in the State Legislature designed to impair their chartered rights, could not, in his opinion, have any effect. He would pay nothing to influence legislation one way or the other. The "Central Underground railway," with which the name of Mr. Vanderburg has been prominently associated, is another work concerning which the public would like to know something. At last accounts certain English capitalists were about to take control and move forward. Mr. Vanderburg expresses no doubt as to the ultimate success of the undertaking, simply remarking that it remains with the "London syndicate" to determine what shall be done. The East river bridge steadily advances. Forty-four of the 76 strands for the main cables have been completed and two others have been commenced. The original plan of the structure has been modified somewhat, to avoid exposing so much surface to the wind. Progress is most noticeable in the tearing down of an entire block of buildings in Frankfort street, near Cliff, to make room for the approaches.

HOOSAC TUNNEL.—The annual report of General Manager Prescott, sent to the Massachusetts Senate on the 1st inst., embraces the usual detailed description of the line; also a statement of the Treasurer that there remains on hand of the appropriation of 1877 for the completion of the road the sum of \$17,248.75, and also the \$10,000 to construct the Union station at North Adams. The increase of business during the year has been highly satisfactory; the number of passengers over the road has been 120,879, against 68,715 in 1876. The total tons of freight moved over the road were 325,992. The total tons of through freight in 1877 were 282,967, against 202,093 in 1876. The total receipts were: For passengers, \$46,825.67; for freight tolls, \$92,869.90; for mail service, express, and extra baggage, \$4,445.68. The total expenses were \$60,235.31, of which \$2,416.27 were for re-rolling old iron, leaving the net receipts of the road \$97,905.94. This is nearly equal to 5% on \$2,000,000 of the debt incurred in construction of this tunnel. The New York Central road is sending a large business over the line, placing it on equal terms with all its other connections.

CANADIAN PACIFIC.—A dispatch dated Omaha, Neb., says that Senator Cronwall, of British Columbia, and Messrs. Roscoe and Dewdney, members of the House of Commons from Victoria and Yale, passed through there recently on their way to the Canadian Parliament, and then adds: They are prepared to push the building of the Canadian Pacific road, which was promised to British Columbia when it became a part of the Dominion of Canada, but which has been deferred. Surveys have been completed for the entire line. A practicable pass, but 360 feet high, has been found through the Rocky mountains, and it is proposed to make Burrard Inlet the western terminal point coming down Fraser river. The road will have its eastern terminus near Fort William on Lake Superior, will pass through Assiniboine City, touch the headwaters of the Milk river, and pass in the neighborhood of the 50th degree of latitude. Pending the tardy action of the Canadian government, capitalists in the northwest have taken hold of the matter and contracts are already let for about 400 miles.

SOUTH AMERICAN PROJECTS.—The following is late railway news from Colombia, South America: Work on the Antioquia railway is progressing favorably. With 125 men 2,900 feet was laid in August. The contractor now proposes to put 500 men on as soon as he can get them. Mr. Ross has a contract for the construction of the Central railway, at a cost of \$20,000,000. He is to receive a subsidy of \$250,000 a year for 22 years, and 25% of the product of the customs. The general direction of the Central railway will be from a point on the west bank of the Magdalena, below the mouth of the Sogamosa, or the Ciénaga de Pataria, and will proceed via the Lehija river to Bucaramanga, and thence through Piedecuesta and Somjil to Bogota, passing as near as possible to the larger towns in the States of Santander, Boyaca and Cundinamarca. The contractor will be allowed 12 years to complete the railway, allowance being made for any stoppage of the works for which the contractor is not responsible.

RAILROAD TO THE BLACK HILLS.—According to an Omaha dispatch, Government director J. H. Millard, of the Union Pacific, says that at the annual meeting of the Union Pacific directors, they decided to begin work in April on the Black Hills railroad, and complete 125 miles as soon as possible and probably push it into the Black hills by fall. It will start from a point, yet undecided, somewhere between Sydney and Cheyenne. Rapid City will likely be the Black hills terminus.

CENTRIPETAL RAILWAY SYSTEM.—The New York Board of Trade and Transportation has issued a pamphlet describing the centripetal railway system devised by Mr. Albert G. Buzby. This consists essentially of a substantial permanent way, composed of a center or hearing rail and two outer or steadying rails, combined with distance or brace pieces so as to form one continuous structure. The cars and locomotives have double flanged hearing wheels adapted to the center rail, and side steadying wheels without flanges adapted to the outer rails. Each set of wheels has a separate and independent axle, and all are arranged so as to have a swinging and lateral as well as perpendicular motion, each independent of the other. It is claimed that the load is mainly carried on the center rail, and that there is no grinding action in passing over curves. The center rail may have a face of any width, and thus the adhesion of the locomotive wheels is materially augmented, admitting of the use of heavy gradients. Curves of 50 feet radius are claimed to be possible under the system.

OIL PIPE LINE IN RUSSIA.—The following is an extract from a letter lately received in New York from a friend living in Russia: "It should be known in New York, especially in oil circles, that a certain Dr. Tweddle, from Pittsburgh, America, is here seeking a grant from the Russian government of land from Baku to the Black sea. He proposes to lay iron pipes to convey petroleum oil by this means to ships for transportation. The affair is very serious, as it will, if carried out, entirely kill the American petroleum trade with Europe. The government looks very seriously upon the scheme, and it may receive its sanction. It is understood that a Russian gentleman named Bodisco is concerned in the movement. The way to stop further progress is for New Yorkers to put men on the scent to bid for the franchise, which the parties named expect to get free."

VICTORIAN RAILWAYS.—The locomotive has now reached Hamilton, Victoria. Hamilton, which is about 220 miles from Melbourne, will soon be in communication with two seaports, as an extension to Portland, a further distance of 63 miles, is in a forward state. In all probability a railway will be open quite through from Melbourne to Portland early in December, 1878. The first section of the Gippsland line was opened by the minister of railways, October 5th. This section starts from Oakleigh, and goes as far as the Bunyip, the distance being about 34 miles. The third section, which connects Morwell with the Gippsland terminus, was opened some months since.

ROOF FOR A ROUND CISTERN.—At a recent meeting of the Edinburgh Engineers Society, Mr. Romanes described a form of roof which he had designed for a round cistern. The usual tie-rods are superseded by a central pillar, from which the roof is supported, umbrella-wise. To regulate the supply to the cistern, the opening of the pipe is closed by means of a cap-shaped covering pressed hard against it by a lever worked by the float.

NEW ORLEANS & PACIFIC.—The Louisiana legislature has passed a bill lending to this company land of the State to the amount of \$2,500,000 to aid the construction of this important enterprise from New Orleans to Shreveport, a distance of 288 miles, and thence to Marshall, Texas. All but 85 miles were graded some two years ago, and it is expected that the State aid will insure the completion of the work this year.

What to do with Prison Labor.

The *Western Shoe and Leather Reporter* says: The worst apparent obstacle which must be overcome before people generally will concede the propriety of taking skilled mechanical trades out of convict hands is the alleged difficulty of finding employment for the States' prisoners, that they may not become a dead burden upon the community. Another and great obstacle is found in the weak and good natured theories of the impractical, dreaming, humanitarians, who demand an industrial if not a high school education for felons. Fortunately the latter class will have but a limited influence upon the net result once it is presented to the tax-paying community at large, who will regard the question simply and solely from an economical point of view.

We confess that the first objection is a matter which opens up a wide field of argument. We have immense and costly penitentiaries, the construction of which has fed the flames of patriotism through the media of fat contracts, and the maintenance of which affords still greater scope for the employment of that noble army of political martyrs who deem it sweet and glorious to live in one's country. It is claimed that the contracting of convict labor has enabled these charitable institutions to become self-supporting or nearly so. That they appear so to be under the system, we will admit for the sake of argument, at the same time expressing our sorrow for the fact that this appearance is a delusion and a snare in all the instances within our ken.

But to the original objection. There is a very simple plan for utilizing the labor of convicts which, we believe, has been suggested before, and which if carried into effect, would make the convict self-supporting, add to the permanent wealth of the State, and at the same time in-

crease the undesirability of getting within the grasp of the law. The great State of Illinois, as everybody knows, is sadly deficient in the matter of good roads. Suppose, for example, that during the recent reign of mud the State had been gridironed with macadamized highways throughout its length and breadth, should we not have been able to do an immense amount of business which was utterly lost? Would not millions in value of the cereals and other products have been marketed, which as the case stands, were totally hlocked in the country through the impassability of the roads? Now, suppose that in place of our present method of furnishing the enemies of society with elegant residences, giving them, gratuitously, board, lodging, clothes, lights, fires and a trade, we should set them to work building the roads which we must have some way or other before many years. To be more explicit, suppose that each county in the State should be allowed a quota of the State's prisoners proportionate to its population, to make roads within such county, the county providing food, shelter and supervision for the convicts. There are no practical difficulties in the way of such a scheme which once we overcome the senseless conservatism of precedent and usage. Were such a system to be inaugurated, in ten years we should have roadways all over Illinois as solid and lasting as the old Roman military roads. Further than this, we should protect honest labor from the degrading competition of slavery; we should make it uncomfortable for the higher classes of criminals, and a few savings bank presidents in the gang would exercise a greater moral effect upon people in positions of financial trust than all the sermons and tracts between Hades and Texas could have.

The State has no right to go into business as an individual in competition with its own citizen.

The man who outlaws himself by violation of the provisions made by society for its protection by common consent becomes the penal slave of that society. He should be used as far as may be for the benefit of the society he has wronged, and not for the profit of penitentiary rings and contractors in collusion with them.

Reducing the Indian Territory.

The bill now before Congress, introduced by Mr. Seelye, providing for a division of the Indian Territory so as to open up the eastern half to civilization, offers a fair solution of the curious problem connected with that interesting portion of the country. The Indian Territory contains some 70,000 square miles, extending from about latitude 37 to 34, bounded on the north by Kansas and a portion of Colorado, on the east by Missouri and Arkansas, and on the south and west by Texas. This great domain, equal in extent to the entire six New England States, and containing a vast amount of beautiful, fertile lands, in a delightful climate, is now the exclusive property of some 50,000 or 60,000 Indians, a large part of whom are wretched savages, connected with civilization only by their intercourse with the rascally Indian traders who sell them whisky, and arms with which to make war upon the United States Government. A fraction of the aborigines, living in the eastern portion, have adopted civilized modes of existence. For these the bill proposes to set apart, in the eastern half of the Territory, land to the amount of 320 acres each, throwing open the remainder to settlement, and devoting the proceeds to civilizing and improving the present occupants, leaving the western half to the wild Arapahoes, Kiowas, Comanches and Apaches, and to any of the partly civilized tribes that prefer the savage life. At present the only railway within the Territory is the Missouri, Kansas & Texas, which runs through it from north to south, and a few miles of the Atlantic & Pacific road. Although the country is admirably adapted to attract immigration, even the civilized tribes have shown the most determined opposition to the entrance of railways and white men. But the march of civilization cannot long be arrested by aboriginal prejudice, and the bill is as much in the interest of the red men as it is of the dominant race before whom savagery is necessarily and rapidly passing away.

Poor Prospectors.

A contemporary in commenting on the subject of poor prospectors, reminds the large class who regard "rich as a gold mine" in its proverbial acceptance that large expenses attend the opening of a mine, digging and blasting through solid rock, making openings for working and ventilation. When fully understood, no one will ask why one person does not succeed. If his bank account be large enough he will. Look at the cost of the openings and machinery on the Comstock, the richest of the rich. Does any one think one individual could stand it? So it is with the prospector. He finds the mines, and as a miner knows he cannot go into the earth and open up the mine on a paying basis; he knows he must contend with hard rock, much timber, must open levels and air passages; he needs machinery to pump and hoist, and then, after his ore is on the dump, what has he? A lot of rock containing precious metal, with a lot of hase metals. This must go through a process of working that requires more machinery. He has no bank account, owes the tailor for his clothes and the grocer for his grub, and must sort out the best of his rock and sell it at a sacrifice to keep him in daily bread.

Is it not wise to sell his claim for a few thousand dollars and return to his old home in the land of civilization? Yet how few do it. He cannot resist the love he has for the miner's life, the charm of being away from all the works of man, alone with God and nature, delving into the mountain.

Mining, like all other business, must be conducted with economy, and wants a practical miner at its head. Nearly all the failures of Eastern investments have been caused by sending out some friend or relation of some of the company to take charge of the mines, who has not the slightest idea of how silver and gold mines are found, let alone how they should be worked. Theory is good, and practice is better, but theory and practice are above either alone. Let your metallurgical students go into the mines and there learn to swing the pick, to drill, to blast, and to distinguish ore from barren rock; let them go into the field and become familiar with the practical part of mining life, and then less money will be thrown away and squandered, and many a valuable property, in place of being condemned, will be made to yield many returns for the money invested.

The Future of Nevada.

There is nothing more certain than that the State of Nevada is destined to become great and prosperous. But yet in her infancy, the Silver State is daily developing resources that astonish the world. The far-famed mines of ancient history sink into insignificance when compared with the Con. Virginia, California or any of the claims on the Comstock that have paid or are now paying dividends.

There is not an acre of sagebrush land that, with irrigation, is not susceptible of the highest cultivation. The valleys raise cattle that are considered the best sent to the San Francisco market. The bunch grass is the most nutritious in the world, and will make poor animals fat in less time than any ever heard of. In every direction new mines are being opened out, and now that the one-ledge theory is obsolete, the attention of capitalists is called to Esmeralda, Tuscarora and other districts heretofore supposed to be barren in mineral-bearing quartz, and the Comstock is left to the bonanza kings. Everywhere in the State prosperous ranchers are to be found, and before another decade shall have passed away land that now supports but the everlasting sage will, by means of artesian wells, become more valuable than the much vaunted and oftentimes overflowed lands of the Sacramento valley. The above mentioned land is fast becoming valueless on account of the vast accumulation of debris in the river, and must decrease in price. The stock men of California are looking to Nevada for grazing farms, and are desirous of investing their money to promote irrigation schemes. For raising Angora goats this country has no equal. This is a fact patent to all who have paid any attention to the business.

Now, taking into consideration all these facilities, it is no stretch of imagination to expect it to become a great and thriving State. Near neighbors may deride our apparently sterile country, they may laugh at our great stretch of sagebrush land, but a time will come, and speedily, too, when the Eastern farmer will pause on his way to the Coast range, and make Nevada his home, convinced of the fact that a few acres of good land in this State is of more value than a whole farm in many others. Our mines we claim to be inexhaustible and as yet but partially developed, and so we predict a brilliant future for our Silver State.—*Carson Tribune.*

Inflammable Gas in Lake County.

J. H. Jamison in a late letter to the *Bee*, describes a gas-emitting mound located near Kelseyville, Lake county, as follows: "We have here one of the grandest sights to be seen anywhere in the State—that is the gas mound situated on the eastern boundary of the town of Kelseyville on an elevated piece of ground. This mound covers about one and a half acres of land; the gas is driven up through the surface of the soil almost the entire area and can be set on fire with a match. Will burn a bright blue light for hours and can be seen for a long distance at night. This gas-mound belongs to John Kelsey and W. G. Young. They intend to put it to valuable use at some future time. There have been three small shafts sunk on it—one to the depth of 80 feet—which sends the gas up very strongly, so much so that it will not burn long at a time—but place a tin lid over the shaft, or hored well, with small holes punched in it and it will burn for several days and nights without going out. I have seen a pipe fastened on to the top of the shaft and led off 20 feet, with the end of the pipe put into a cooking stove and the gas set on fire, and a pot of cold water set on the stove, and it boiled in 20 minutes and cooked eggs as nicely as eggs were ever cooked anywhere. This gas can and will be used to run machinery with, and can be used to light up the town and to heat up stoves, with but little expense. How long it had been in existence no one knows. It was discovered ten or twelve years ago. The gas burns at any and all seasons of the year, but gives a brighter light in the winter and spring. It is indeed a great natural curiosity among the many natural wonders of this county."

THERE is no distinction made between gold and greenbacks, used in the ordinary trade channels in Eureka, and but one cent discount at the banks.

Labor and Capital.

Labor and capital in conflict are in an unnatural state; harmony is their true relation. For reasons already given, capital finds its account in the cheerful service of labor, not in its discontent. To labor, capital is a benefactor in the highest sense; were the whole class of capitalists with all their accumulations to be annihilated, labor would be reduced to indigence and a struggle for existence more severe than can easily be conceived. The capitalist is the captain of industry, who takes the inorganized mob of men, drills it into a disciplined army, supplies them with weapons, ammunition and commissariat, and leads them to industrial conquests. He is able to do so because he has accumulated instead of merely consumed; his right to his million rests on exactly the same ground as the workman's right to his week's wages.

By what method to restore a lasting harmony between the two is a great question of the day. The first and simplest method is hy arbitration. Where it is possible to obtain referees, in whose impartiality and intelligence both parties have confidence, and where both are ready to submit their case, disputes are easily settled and harmony restored. The ordinary courts of justice are not available for the purpose, because they can not adjudicate the terms of contracts not yet made, and because the judges have no special acquaintance with the matters at issue. The establishment of tribunals of arbitration chosen from both masters and men, with the sanction of government, has been successfully tried in England, and these have put an end to several recent strikes and lock-outs. Something like these, though more official in their character, were the *Conseils de Prud'hommes* of medieval France, which were revived by Napoleon I., in 1806; but the latter are rather government courts of selected experts to decide legal issues.

A second solution is offered by the system of co-operation, whose advocates would abolish the conflict between capitalist and laborer, by uniting the two functions in the same persons. They would have workmen unite their savings to establish a workshop of their own, to be managed by foremen of their own selection under rules adopted by the whole body.

Instances of this industrial method are to be found very early in our own country. The Greek merchant marine is based on the same principle, and it has secured, through the zeal and energy of its sailors, nearly the monopoly of the carrying trade in the Mediterranean. But the first proclamation of the method as a means to revolutionize industry and commerce was made by the socialist Robert Owen. His design was to set up co-operative stores rather than workshops; to abolish the profits of middlemen rather than to get rid of the wages system. About 1824-30 many societies were formed on this basis, to make "every man his own shop-keeper." The most successful was the "Rochdale Equitable Pioneers," organized in 1844. The political troubles of 1848-50 called attention to this method and to successful applications of it to industry in France. The Christian socialist party (F. D. Maurice, Chas. Kingsley, Thos. Hughes, J. M. Ludlow, etc.) urged its general adoption as a remedy for the deadly competition of the wages system. Every man was to be his own employer as well as his own shop-keeper. In spite of many failures, co-operation has an honorable record of success to show in France, England, Germany, Spain and the United States.

Less open to objection as a solution of the question is the plan of industrial partnership. In this, the proprietor of an establishment agrees to pay his workmen the current rate of wages, and also to distribute among them at the end of the year all or part of the net profit above a certain percentage, say 15% or 20%. This method identifies the interests of labor and capital without confounding their functions. The men are stimulated to do their utmost—to avoid all waste as tending to diminish profits, and all careless work as injuring their market—and to keep each other up to the mark by the force of public opinion.—*Prof. Thompson, "Social Science."*

A GREAT ARID DESERT.—Recent explorations in Australia show that, in addition to an extraordinary lake of salt water in the center of the country which blights thousands of square miles of territory in its vicinity, there is beyond an arid desert of greater extent than any other in the world, on which there is neither animal or vegetable life to be found, and even on the borders nothing but the driest sage brush can be seen. An attempt was made to survey this sand sea at its supposed narrow part, and after traveling 300 miles the camels showed signs of exhaustion, and a return became absolutely necessary; but habitable ground was not reached before several of these supposed monarchs of the Sahara dropped dead. It is thus shown that only the western part of Australia can be utilized as a refuge for thousands of Europeans who are seeking homes in the new country, that more than half of the island continent will not support men or animals, and hence that the limit of population can already be approximately estimated.

At the present time trade generally is dull in all the centers of labor throughout Scotland, and large numbers of workmen are out of employment. Wages are everywhere being reduced.

USEFUL INFORMATION.

Mining and Cleaning Kaolin.

Although most of the claimed discoveries of porcelain clay in this State have brought to light nothing but infusorial earth, the search for the genuine article is still proceeding with unabated interest. This being so, an account of the process of mending and cleaning, as practiced at the village of Mertztown, 20 miles east of Reading, Pa., where rich beds of kaolin have been discovered, will be of interest. The process of mining and cleaning the clay is curious and interesting, and like the mystic machinery used in plumbago mining, demonstrates the fertility of human genius. At the Mertztown clay mill one 25-horse power engine turns the innumerable cog-wheels in the intricate machinery. The clay is taken from the mine, or more properly bank, carried in small trucks over an inclined plane, to the washery, where it is dumped. Here it is thrown into a tank or washer containing a large body of water brought through a syphon from a spring one-quarter of a mile away. From the action of the washer the clay is suspended in solution and carried off through three sieves into what is called a sand box. From this secret box, into which prying eyes cannot peep, it passes through a series of 28 vats, each ten feet long, five feet wide, and five feet deep. From the vats it is pumped into hydrostatic presses until they become full. The presses are then opened and the clay, in corrugated rolls, is taken out and placed on shelves in steam-dry houses, where it remains 48 hours. From the dry houses it is wheeled to the packing room, put in casks or barrels, and shipped to various parts of the country. The entire product of these works is used in the manufacture of paper. The product of the Mertztown mines consists of nearly pure silicate of alumina, with small quantities of oxide of iron, potash and water, and is the only white or China clay used in making fine paper in the United States.

The Hours for Gas and Lamp Light.

The *Gaslight Journal* gives a table showing the length of lamp and gaslight time in each month of the year. It is published chiefly as a guide to gas makers in regulating their supplies, but it is of popular interest in many obvious ways. The table shows the number of hours from sunset to 10 o'clock at night, for each month in the year, with the average for each month, and the comparative length of the evenings.

MONTH.	TOTAL.		AVERAGE.		Comparative length of evenings.
	Hrs.	Min.	Hrs.	Min.	Hrs.
June.....	76	55	2	34	100
July.....	83	52	2	42	109
May.....	88	38	2	51	116
August.....	99	16	3	12	132
April.....	102	47	3	25	134
September.....	115	24	3	51	150
March.....	127	06	4	06	165
February.....	132	50	4	45	172
October.....	140	14	4	31	182
November.....	153	35	5	07	190
January.....	163	16	5	16	212
December.....	168	25	5	26	218

The first column gives the months arranged according to the length of the lighting time in each month, commencing with the shortest. The second column gives the number of hours in each month from sunset until 10 o'clock, P. M. The third column the average number of hours in each day of the different months; and the last column, the relative length of burning hours in each month, assuming the number in the shortest month to be represented by 100, and calculating the other months by proportion.

EXPERIMENT WITH GAS METERS.

Some of our readers have doubtless been puzzled by the eccentricities in their gas bills, but we never heard a worse case than the following: The late Bishop Whitehouse, of Illinois, made some curious experiments on this subject several years ago. Having discovered the fact referred to, that the less gas he burned the more he was required to pay for it, he determined to subject the law which appeared to govern the phenomena of gas consumption to a severe scientific test. He carefully shut the gas off the meter in his house, had a carpenter accurately fasten all the doors and windows, and went to England to attend the Pan-Anglian Council. When he returned the official reader of meters visited him and inspected the dials in his cellar. Then came the bill, and the law was firmly established, for the good bishop was charged for a third more gas a month during the time of his absence than he had ever been asked to pay for before.

AMERICAN ISINGLASS.

The best quality of American isinglass, says the *Polytechnic Review*, is made from the sounds of the hake. The crude material is collected during the summer and autumn, coming from Maine, New Brunswick, Nova Scotia and Prince Edward's island. The conversion of the crude material into the mercantile article takes place in winter. A low temperature is necessary, in order to turn out by machinery the fine ribbons of isinglass, and ice-water passes through the rolls. The total product is about 25,000 pounds. Besides the use of isinglass for fining beer, etc., it is employed as a dressing or glaze for straw goods in the United States.

NEW USE FOR TEASEL STEMS.

We have had some account of attempts to turn the teasels which grow all over our State to some practical account instead of spending money, as our woolen mills do, for the imported article. We read in the *British Trade Journal* that an entirely new commercial article has quite recently arrived in that country from France, in the shape of a curiously twisted stem. This stem, which is flattened and spirally twisted, and marked with deep corrugations or channels, proves to be that of the Fuller's teasel (*Dipsacus Fullorum*), a plant very much cultivated in southern France and Austria for the sake of its prickly flower-heads, which are so extensively imported into England for carding or raising the nap on cloth. Hitherto, the only application to which the stems have been put has been for fuel, or for manuring the ground after they have been allowed to rot. Their present use is for the handles of ladies' sun shades and parasols, and when manipulated they have a very grotesque and striking appearance. Several thousand of these fasciated teasel stems are now in England, and they will issue as a novelty during the coming season. At a recent meeting of the Linnean society, some of these fasciations were shown as imported, as well as a finished parasol with a teasel handle, sent by the firm who intend bringing them out. At one time these fasciated stems were supposed to be very rare, but, from the fact of so many being now introduced, they would seem to be of common occurrence. It remains to be seen whether they are so abundant as ever to form a regular article of import, as is the case with orange, olive, and other sticks of foreign produce.

AMERICAN COTTONS IN CHINA.

Mr. Davenport, the British Acting Consul at Shanghai, concludes a review of the local market for cotton goods in these terms: America seems bent on imitating Great Britain in her products, and has actually shipped to China large quantities of heavy cottons termed continental sheetings, but in reality a cross between a good gray shirting and a T-eloth. Although hitherto these sheetings have resulted in loss only, both to the importers and manufacturers, yet they are genuine articles, free from oversize and all the other adulterations employed in the Lancashire mills, and not being liable, therefore, to mildew, bid fair to assert a front place in the foreign trade with China. It will be a long time, however, before it utterly supplants the British textile which it seeks to resemble. China clay and other deleterious substances are less costly than pure cotton; the cost of production in England is far below that in America, and until lately the Chinese have always run after the cheaper commodity, as long as it possessed sufficient cohesiveness to hold together under the needle, and not fall to pieces in a shower of rain.

The Law of Rest.

William Walter Phelps recently made an address on the American habit of hard work before a meeting of physicians and surgeons. Among other things, he said: We are a nation without contentment, without rest, without happiness. In a feverish race, we pass from the cradle to the grave—successful men, to whom life is a failure. Our boys leave the university, when English boys leave their school. Our merchants leave their trade, retiring to some more dignified or honorable work, as they believe it, at an age when the German merchant first feels the master of his trade. We are always anticipating the future, forcing the task of a whole life into part. Worse, we are not content with doing a year's work in a month in our own calling, but we must do enough in all other callings to win distinction there. In other lands it is enough to be a lawyer, physician, clergyman, merchant. Here we are nobodies unless we fill the sphere of all human occupations. He must be a statesman, and know political science as if already in office. He must be an orator, and ready to persuade and instruct—a wit, to shine at the dinner-table—a literateur, a critic. There is too much human nature in man for this to mean anything except a discontented life and a premature death. And the remedy?

Correct public opinion. We must honor the man who faithfully does his task, whatever it be. Not the task, but the faithfulness with which it is done, must be the measure of the honor. Then men will be content with their father's house or their father's trade. This will give us that family association which is a sure pledge of good conduct and patriotic love. This will give us too that traditional aptitude which alone gives great mechanical excellence. It will not be a bad time for American manufacturers when we find stamped on them, what Mr. Griffis finds on Japanese bronzes—"Done by the ninth generation in this family." Then men will keep the occupation of their youth for their age, and having leisure, will build the foundations broad enough to withstand bankruptcy. Then men will seek excellence in other callings, and not compete with the excellent in other callings. Then men will alternate labor with rest, and obey the law which God has written on creation—God, who Himself rested after toil—God, who shrouds the earth with the night, that it may take its daily sleep—God, who speaks to the torrent to stop at once amid its maddest plunge.

Hints for the Wakeful.

If you cannot get sleep when you first go to bed, says *Hall's Journal of Health*, give orders to be waked up at daylight, get up promptly, do not sleep a wink during the day, go to bed at your regular time, with directions to be waked as before; in a week you will find that you can go to sleep promptly, but then be careful to get up as soon as you wake in the mornings, thus you will soon find out how much sleep your system requires, and act accordingly. Always avoiding sleeping in the daytime; for if you require seven hours sleep, and spend that much in sleep at night, what ever time you spend in sleep during the day must be deducted from that seven hours, or you will soon become wakeful again. If you wake up in the night, either go to bed two or three hours later or when you wake, get up, even if it be but one o'clock in the morning, and do not sleep a moment until your regular hour for going to bed; and if you go to bed regularly, get up as soon as you wake, and do not sleep in the daytime, you will find out in less than a week how much sleep you require, then act accordingly. Nature loves regularity, and the four hours sleep from ten to two, is worth six hours after twelve o'clock. The great rule is, retire at a regular early hour and get up always as soon as you wake, if it is daylight. If persons have force of will enough to keep from going to sleep a second time, it is greatly better to remain in bed ten or fifteen minutes after waking up, to think about it, and enjoy the resting of that kind of feeling of pleasurable tiredness which comes over us on waking, especially if we have taken more exercise than usual the previous day, or have been kept up later.

TREATMENT FOR CORNS.

The *Druggists' Advertiser* handles this painful subject as follows: Keep the feet clean by frequent ablutions with warm water, and wear easy, soft boots or shoes. Without the latter precaution, corns will generally return, even after they appear to have been perfectly removed. After soaking the feet in warm water for a few minutes, pare the corns as close as possible with a sharp knife, taking care not to make them bleed. Place upon the part affected a small, circular piece of leather or buckskin, spread with some emollient plaster and having a hole in the center corresponding to the size of the corns. They may now be touched with nitric acid by means of a small glass rod or wood tooth-pick, due care being taken not to allow the liquid to come in contact with the neighboring parts. Repeat this process daily, until the offender be sufficiently softened to admit of removal.



W. B. EWER.....SENIOR EDITOR.

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Saturday Morning, April 6, 1878.

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The Week.

The advent during the week of what promises to be staying good weather has not only served to improve the spirits and temper of the people, but also to enliven business generally. From all parts of the coast we hear a good account of the growing crops, as well as of mining operations, and it will not be long till times are much easier, at least in the country. As yet there has not been much revival of building in this city, although there will be a large amount done the present season in Oakland.

The establishment of a new water line with a broad street along the water front, and the harbor improvements required at North Beach, as provided for by an act passed by the late Legislature, will create a demand for considerable labor in the city, where the number of the unemployed is every week being diminished.

The feeling of anxiety in London, is very great and warlike sentiments are becoming general.

Employers' Rights to Workmen's Inventions.

An interesting case has just been decided in the Circuit Court of the United States, District of Massachusetts, with reference to the right of an employer to the invention of a workman in his service.

The complainant being about to start a factory for the manufacture of fancy dry goods, employed E. J. Howard as a machinist, on a salary, he being required to make what machinery was necessary and keep it in repair. During the time of his employment patents for a number of inventions made by Howard were issued to Whiting, his employer. Many of these were for such little additions to sewing and other machines as were necessary to adapt them to the making of fluting, ruffles and ruchings. As these were adaptations of machinery to the special business of Whiting, and the expenses of the applications and the patent fees were paid by him, it seems to have been considered by both parties that Whiting had the sole interest in the patents. Two patents, however, were issued in the name of Whiting, for the inventions of Howard, for contrivances applicable to sewing machines generally, being for improved mechanisms for operating such machines. After a while Whiting claimed that he was the sole owner of these letters patent, and that Howard had no legal or equitable right or interest therein. The defendants claimed that Howard, the inventor, is entitled to an equitable interest in one half of these patents.

Whiting contended that Howard came to him with an understanding that he should make improvements on the machinery of Whiting's factory to the best of his ability, Whiting to have the fullest benefit of them, and the patents were procured merely for the business protection of Whiting, and the manufacture and sale of the machines was an afterthought. The court holds, however, that even if this were so, there is no good reason why Howard should not receive some benefit from the use of his inventions in other factories and from the sale of his invention to others. Howard was not to invent machinery for general use, but only for Whiting's factory. This was not a factory for making or selling machinery, but for manufacturing dry goods with the aid of machinery. The employment to invent and perfect machinery for that purpose, while it would operate as a license to Whiting to use machines invented by Howard, and put in use under such employment, would not of itself, confer upon Whiting any legal title to the invention or to letters patent protecting it. It was contended, however, that the applications were made for the patents on the treadles, Howard assigned the inventions to Whiting, without any consideration other than would arise from the nature of the employment, and that the legal and equitable title to the letters patent was so absolute in Whiting, that he was entitled to treat Howard and the defendants who were using the treadle under Howard as infringers. At the same time Whiting admitted that after the treadle patents were issued he agreed to give Howard one-half the profits from the manufacture and sale of the treadles as long as Howard was in his employment, and a separate account was opened in Whiting's book under the head of the "Howard Treadle Account."

It was proved that Whitney had agreed to pay the expense of the treadle patents for one-half interest in each, but the papers were made out in Whiting's name.

An abstract of the decision in this case is given in the Patent Office gazette, as follows:

"The mere fact of employment gives to the employer no title in letters patent for inventions made by the workman while in his service."

"A workman engaged to make improvements in the special machinery of a fancy dry goods manufactory, of which his employer is to have the fullest benefit, forfeits no part of his title to letters patent for inventions which are of general applicability, and not confined to the specialties of construction in the factory machinery."

"The terms of the particular contract may operate as a license to the employer to use the machinery invented by the workman and put in use during his employment, but it would not of itself confer any legal title to the invention or to letters patent protecting it."

"Hence, where the employer rested his suit for infringement on a legal title obtained under such circumstances, the court ruled that the equitable title of the workman, under which the defendants justified, was superior, and that there was no infringement."

"In a court of equity, a party holding an equitable title cannot be ousted of his equitable rights by the holder of a legal title, who in such case stands as trustee for the party beneficially interested."

WASTE OF TIMBER.—Twelve million acres of forest, it is estimated, have been cut down or burned in the United States within the last ten years. Much of the timber is used for fuel, twenty-five cities being on record as consuming from 5,000 to 10,000 acres each. Fences and railways require 150,000 acres per annum. The timber industry employs 200,000 men and \$144,000,000 capital.

Foundry Notes.

Business at the foundries, after a dull winter, still continues slack. Nowhere do we find them employed on any heavy jobs or especially important work. At the Union Iron Works they have in hand a number of ore reduction mills, hoisting works, etc., one of these, a 20-stamp mill, being designed for the Cariboo mines, British Columbia. As this establishment will have to deal with silver-bearing ores it is being outfitted with pans, settlers and all the other equipments necessary for that service. A portion of the machinery has already been shipped to Victoria, and the balance will soon follow. In the newly discovered vein mines of that county there promises to be opened a new field for the products of our machine shops and foundries. How extensive the requirements in this line may be for that quarter cannot yet be foreseen. It is to be hoped that they will be very considerable; but whether large or small they will be mostly filled in this city. At the Union works an 80-stamp quartz mill for the Homestake company, Black Hills, has also been completed and sent forward to its destination. While it is probable that the most of the mining machinery for that region will be obtained from the East, it is still expected that all California and Nevada companies operating there will, as in the case of the Homestake, procure their mills to be made in this State.

At the Pacific Iron Works a five-stamp mill is being built for the "76" company, Globe district, Arizona. Eight pans and four settlers of large size have just been completed here for the Martin White company, eastern Nevada; also one of the Gerrish air-jacket, copper lined furnaces for the Eureka Con. company, a new style of smelter, having great capacity for the resistance of heat.

They are also making at these works an air-jacket copper-lined furnace, Gerrish patent, for Capt. Raymond's mine in the Lodi district, Nevada, and a set of hoisting works for each of the following companies: The Eureka Con., the Blue Jacket and the Empire-Imperial, the Eureka works being of great magnitude. A large-size Walker compound steam pump, for the Savage mine at Virginia City, is also being built here.

At the Golden State and Miners Iron Works a good many Frue concentrators are being made, mostly for Arizona, where they meet with general approval, and are coming largely into use. They have already sent a number of these machines to that Territory, and are at work upon an order for ten more. Four of them employed on the ores of the Silver King mine have given entire satisfaction, turning out a ton and a quarter of concentrations daily, worth \$2,000 per ton. On the ores of that mine they are found to work up to 98% of the fire assay. They are also making at these works many hydraulic elevators, of the kind used in warehouses, stores, etc. The construction of the Severance diamond drill being sort of specialty at this establishment, they are at present engaged on a number of these machines.

At the Occidental they have nothing noteworthy on hand, their usual force being employed on jobbing work of considerable variety. It is the case indeed with all our foundries that they are without heavy engagements at present, their work being of a very miscellaneous character. The interruption of mining operations incident to a long and wet winter, and the depressed condition of many other leading industries, has caused an almost unprecedented dullness in this branch of business; some of our larger foundries having maintained a heavier pay roll than they actually required, simply because they were unwilling to distress their employees, and because they hoped for an earlier improvement in business. With the return of good weather and the cheering outlook for the coast generally, it is now believed that more orders for work will come in, and that with the resuscitation of our other industries this also will experience a revival. Our foundrymen, in fact, count upon being able to secure the usual number of paying contracts and the enjoyment of a moderately prosperous year.

THE WAGES OF SIN.—Ernest C. Stock, Clerk of the Police Court, reports having collected \$5,827 during March. Of that sum \$80 was given to informers under the fine law, \$20 to the Society for the Prevention of Cruelty to Animals, and \$798, to the Home of the Inebriate. There has been \$14,506 collected during the quarter.

The recent subterranean disturbance in Nebraska are regarded as the result of chemical rather than volcanic action. The peculiar soil, becoming soaked with water, forms a sulphuric acid, which attacks the alkaline carbonates, creating heat and internal rumblings.

The English authorities at Hong Kong would not allow any coolies to embark on the steamer belonging to a line intended to introduce Chinese laborers into Peru. The vessel will go to one of the more northern ports of China where there will be a cargo of coolies waiting for her.

ROBERT HASTY THOMES, a pioneer of California and Tehama county died at his residence on Thomas creek, on the 26th ult. aged 58 years. He was a native of Maine, and came to this State in 1844 in company with General Bidwell.

The Protection of Water on Public Lands.

Senator Booth has introduced a bill in the Senate, by the provisions of which we may hope the practice so long tolerated on this coast whereby adventurers and idlers have been able to secure possession of valuable water properties, and hold them for mere speculative purposes, will be prevented. By the terms of this bill the fresh waters of all rivers and streams with a flow of more than 50,000 gallons per day, and of all lakes and ponds of more than one acre in area, upon the public lands of the United States, are reserved, granted and dedicated to and for the free and common use of the inhabitants of the State or Territory where the same are situated, for drinking, washing, and the ordinary purposes of sustaining life, and the remainder, after said purposes are reserved, for irrigation and manufacturing, in their respective order; and no private property or ownership founded upon grant, custom or otherwise, shall ever be created or allowed in such water, to supersede or prevail against said common right of its inhabitants; subject, however, to such reasonable regulations as a State or Territory shall make to protect the first appropriation of water to a useful or beneficial purpose, so long as the same is actually continued, against any subsequent appropriation.

Hereafter all surveys of public lands, and all grants of the same, to promote use or ownership, shall be made to conform to and provide for the reservations and dedication made in this act; and all patents shall be made subject thereto by express terms.

The bill was referred to the public lands committee, of which Booth is a member.

Against the provisions of this bill, it seems to us, no just exceptions can be taken. The manner in which private persons have been suffered to appropriate this part of the common heritage of the people and to hold the same as a perpetual franchise, not paying a cent therefor and sometimes not even converting the franchises so obtained to actual use, but holding them as articles of traffic, has been alike unjust, impolitic and absurd. Where these water rights have been acquired in accordance with statutory and local regulations and afterwards turned to practical account, whether for mining, manufacturing or agricultural purposes, no one will seek to unjustly interfere with them, as indeed they cannot, according to the provisions of this bill, which will render this class of franchises even more secure than before.

From the operations of this bill, should it become a law, there will therefore be excepted the rights and properties of the ditch companies now supplying water for mining and irrigating purposes, and, in fact, all others that have been reduced to actual use and possession. Its more stringent provisions would only effect the future appropriators of water, and that class of locators whose claims are based upon mere notices posted on sticks and trees, or on the placing of some slight obstruction in the stream, the diversion of a portion of the water from its natural channel, and similar acts, which, under the liberal rules that prevailed among the early miners, were regarded as a sort of constructive possession. Under this system of sequestration many valuable water privileges, including some of the finest lakes in the Sierra Nevada, have for years been held as a mere merchantable commodity, awaiting the highest bidder in the market, the pretended claims of these intruders upon the public domain sufficing to deter others from attempting to render these waters practically available, an end which the holders themselves had neither the means nor the disposition to effect. We do not apprehend that this bill will meet with opposition from any portion of the mining community. Instead of being a detriment to that interest, it would, if enacted into a law, aid and protect it by forcing out of the way those who interfere with a more liberal water supply. The present ditch owners have their franchises amply secured, having generally gotten hold of all the sources of water supply tributary to their catchment or within easy reach. They can now only increase their supply by adding to their capacity for storage, an end to be reached through the construction of new reservoirs and the enlargement of old ones. Understanding this, these companies have been careful to possess themselves of all basin-like depressions and other sites favorable for additional tanks of this kind.

In so far as these bill-posters may have any equities, these will, no doubt, be duly recognized by the authorities, State and Territorial, to whom their several cases will, under the law, be referred for consideration. Little danger but they will be amply indemnified for any bona fide rights they may have to relinquish, as well as for any actual work they may have done.

It is said that the appropriation bill proposed by the House Committee will seriously cripple every branch of the public service. In some of the departments a reduction of 39 per cent. of the clerical force, without discrimination, is proposed. The Interior Department is most seriously affected.

JUDGE HASTINGS has paid to the State Treasurer \$60,000 of the \$100,000 agreed to be paid by him, conjointly with seven per cent. interest on the same amount, to be guaranteed by the State for the Hastings College of Law.

"Las Planchas de Plata."

Mr. Jackson Barwise has been explaining in a letter to the London *Mining Journal* the manner in which, as he conceives, the large masses of native silver found in Arizona and some parts of northern Mexico were originally formed. He holds that, at a period not very remote, perhaps not more than 500 years ago, this whole region was subjected to great physical changes, attended by intense volcanic heat. The presence of these masses, "planchas de plata," plates of silver, as the Spanish called them, are themselves proofs of the metalliferous character of this country, while the evidences of its having been at no very remote period subjected to great dynamic convulsions and powerful heat are found in a variety of facts. The tablelands, cliffs and basin-like depressions with perpendicular walls, and other geological features point to earthquake disturbances, while the lava, sand and detritus that everywhere cover the districts in which are found the ancient ruins, present evidences of the intense volcanic action that must have taken place there. As these districts were once densely populated, it is reasonable to infer that they must have been abundantly supplied with wood and water, both of which are now very scarce and in many places wholly wanting. The wood was, of course, all burnt up at the time of these volcanic outbreaks, the running streams and other sources of water supply, that were not then obliterated, having been afterwards filled up by the volcanic sand and cinder drifted down from the foothills and mountains. Owing to the aridity and barrenness of the soil the forests have not since been able to reproduce themselves. Prior to this catastrophe this country was no doubt as well timbered as southern Colorado and most parts of northern Mexico now are. The heat caused by the volcanic fires and the burning of these extensive forests smelted the argentiferous ores and the fused silver escaping collected together, forming the masses of pure metal for which these countries have been distinguished.

The largest of these pieces of native silver ever found weighed, according to authentic records preserved in the city of Mexico, 3,780 lbs. This was found about 150 years ago in Arizona, but at what point is not exactly known, further than it was in the southeasterly part of the Territory. The discovery of this and other large chunks of pure metal caused numerous *buscones*—searchers—or, as we would term them, prospectors, to visit that region of country, where many similar finds with other important mineral discoveries are reported to have been made. One piece of metallic silver was brought in by these parties which, according to these accounts, weighed 108 arrobas—2,700 lbs.

The exactions of the Spanish government—the king claiming a royalty of one-fifth of everything found, and the vexatious restrictions placed upon prospectors checked enterprise and prevented any thorough explorations of the country being made; wherefore it is probable says Mr. Barwise that these large pieces of native silver will continue to be found in that section, the southeasterly portion of the Territory, which appears to have been subjected to the greatest heat, being most favorable for their occurrence.

The incredulous will naturally inquire how it is that none of these big nuggets have latterly been picked up; and it does seem a little strange that they should have escaped the keen eye of the modern prospector who for several years past has had undisturbed access to that portion of Arizona. It would give a new impulse to exploration in that region of country and help the credit of these old records and traditions if a few more of these "planchas de plata" should be found lying around loose off that way. Even if they did not weigh more than a ton or two, they would have this good effect and serve to keep the awakened attention of adventurers steadfastly fixed in that direction. Ores running up into the thousands, like some of those from Arizona, are all very well, but they are so much more convenient, these slabs of pure silver, when a poor prospector is in a hurry to make his pile. They would also come in handy just now for coining the new dollar, as it would be an easy matter to debase them to the proper standard for making that coin.

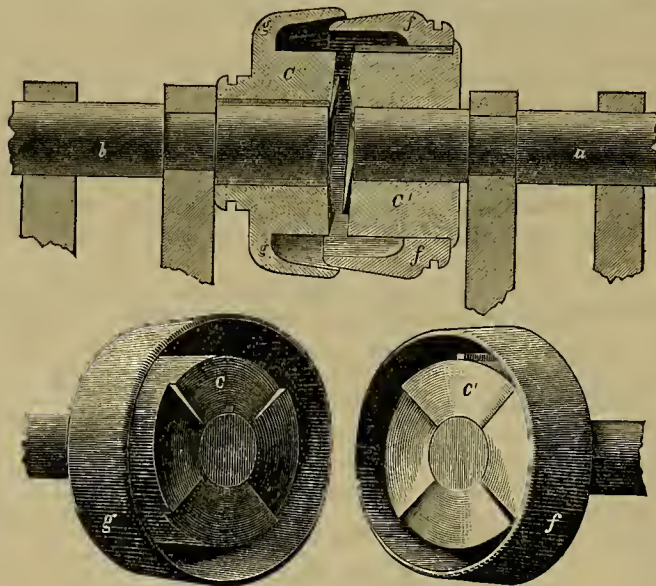
Besides, we have a pride in this matter. As miners we claim to have outstripped all others of whom we have any knowledge, ancient or modern. The way in which we have developed our mines and turned out bullion eclipses the achievements of all other peoples. The rate at which our prospectors have pushed their work of exploration throws the deeds of these old Spanish *buscones* into the shade; and shall it now be said that the latter had more spirit to search after or a quicker eye to detect these godly *planchas* than a free-horn or even a naturalized American citizen? Let this interrogatory be practically answered by the early discovery and shipment to this office of a silver chispa equal at least to the largest of which we have any authentic or unauthentic record. Arizona has distinguished herself by giving to science the largest mass of meteoric iron ever found on the continent; now let her maintain this distinction by producing a mass of virgin silver of equal size, though she need not be particular as to the shape.

Further About Emptying Bear River.

We in California are constantly astonishing people abroad by the strangely anomalous character of certain mining enterprises here set on foot. First were the exploitations of the pliocene rivers, remarkable alike for the theater of operations and the mode of conducting them. Having got this business well under way, we are now ready to commence the work of cleaning out more modern but equally broad and auriferous streams, a service happily exempt from much of the troubles and uncertainty attendant on the exhumation of these dead and long ago buried rivers.

In speaking, a few weeks since, of the scheme for tunneling through the ridge near Dutch Flat, we were in error in saying this grade of that work would be but two and a half inches. This is the grade of the river above, the inclination of the tunnel itself being four inches to 12 feet, a pitch that will carry the gravel through it at a sufficient rapid rate. Since the details of that scheme were perfected, the projectors have been fortunate enough to secure the active co-operation of some of our most energetic business men and capable mining engineers, who, in addition to these qualifications, will bring to its aid influence, capital and other elements of success.

This enterprise, as we are informed, does not trench upon the franchiss or ground of another of like kind, inaugurated upon Bear river, but at a point farther down. These parties, who some four or five years since spent a good deal of money in obtaining title to a large section of Bear river and the whole of Greenhorn canyon, its principal tributaries and in procuring the



OSBORN'S SHAFT COUPLING.

necessary surveys, examinations, maps, etc., to be made, contemplate, like their neighbors above, the construction of a tunnel through the ridge lying between this North fork and Bear river. The site fixed upon for this adit is about one mile above Colfax and half a mile below the mouth of Greenhorn canyon, and in the immediate vicinity of Cape Horn, a noted point on the Central Pacific railroad. Here the two rivers approach each other so closely that a tunnel of but a little more than two miles in length would suffice to drain Bear river into the North fork.

This enterprise, like the other, offers great inducements for capital, from the fact that the company's claim covers an immense quantity of rich tailings. According to the report of their engineer, this material amounts to some 30,000,000 cubic yards, which it is estimated will, on a second washing, yield about 60 cents to the cubic yard. Into the gulches and streams to be cleaned out by this company many hydraulic mines are constantly discharging their tailings; rendering it almost impossible to ever wholly exhaust the material here to be operated upon.

While the cost of the outletting tunnel would, because of its greater length, be considerably more here than at the point above, such disadvantage is off-set by the fact that the claim of this company covers a much larger quantity of these auriferous tailings than the other, the material being claimed to be very nearly as rich in gold. The main Greenhorn, as well as Missouri and Red Dog canyons, and other of its confluent, were noted in the early days for the rich diggings along them, and there can be little doubt but the debris from them would pay enormously on a second handling. That they should have been neglected so long has been owing to the craze of our people to invest in stocks and silver mines located a good way off. At not more than a dozen localities in the State are these tailing deposits so situated that they can be handled to advantage; wherefore it is probable that such as can be readily utilized will soon pass into the hands of capitalists and be turned to profitable account.

Improved Shaft Coupling.

The accompanying engraving represents a novel construction for shaft couplings, recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by Ambrose A. Osborn, of this city. By the method employed, shafts running at any rate of speed may be connected without clash or jar, and at the same time in a perfectly secure manner. This is effected by combining a friction with any form of clutch coupling in such a manner that the part of the shaft to be connected is put into motion by the friction device and this positive clutch can afterwards be locked.

In the engraving, *a* represents the shaft driven by any power and *b* is another shaft which stands in a line with the first shaft. These shafts are provided with any form of clutch or rigid coupling device, as shown at *C*, and the clutch is operated by a lever. The difficulty in using this class of rigid couplings, especially on fast-running shafts, is found in overcoming the inertia of the stationary shaft without a disagreeable jar or danger of breaking the parts. In order to remedy this difficulty the inventor employs, in combination with the clutch or rigid couplings, a friction-coupling, which operates as follows:

A cylinder, *C'*, is secured to the driving shaft, *a*, and the conical portion, *f*, of the friction-coupling slides back and forth upon this cylinder, as shown, to which it is united by a feather, so that the two rotate together. The cups, or inclosing portion, *g*, of the friction coupling is secured to the shaft, *b*. It will be seen that when it is necessary to couple the shafts together, the parts, *f* and *g*, of the friction coupling are first brought together by means of the

Opinions in Advance.

"The Explorers," Miners' and Metallurgists Companion," by J. S. Phillips, contains a chapter entitled "Where to Explore," which, although written some seven or eight years since, indicated with much accuracy the most favorable fields wherein to search for the precious metals, as subsequent events have shown.

There are, says the author, in the countries lying west of the Mississippi, four extensive mineral-bearing regions that strongly invite the prospector for gold and silver. The first of these begins in the Guadalupe and Sierra Madre mountains in Mexico, and passes northwesterly, embracing in its course the Chiricahui, Catarina, Maggolon and Pinal ranges of mountains in Arizona. Many facts on record in the city of Mexico, as well as the ancient excavations and other mining relics found in this section, demonstrate it to have been rich in mineral wealth, the hostility of the Indian tribes who inhabit it having prevented the modern explorer from entering it.

The second of these broad mineral-bearing zones consists of the Sierra Nevada range, which, commencing in the southwesterly part of California, extends thence in a northwesterly course some 500 or 600 miles, uplifting on the California side the talcose clay slates and on its easterly flank patches of clay slate, lime, etc. For the westerly slopes of the Sierra Nevada our author foretells an active and prosperous mining future, its accessible position, abundant supply of wood and water and other favorable conditions, placing it in the front rank as a mining region. When the desires of our prospectors to visit the remote and little-known interior shall have abated; when wages and interest upon money shall be cheaper and many of the mistakes and abuses now prevalent in mining shall have been corrected, the mineral resources of this belt will receive the attention they deserve, and mining be pursued here with economy and profit. When that day arrives, adds the writer, the reduction of auriferous quartz will be carried on here as cheaply as in Brazil, Australia or New Zealand and scores of ledges will be worked where there is now but one, while the discovery of new lodes will be numbered by the thousand.

And not only within the limits of California will this range prove a broad and profitable field for mining enterprise. After it has left this State, and, passing on north through Oregon, Washington Territory and British Columbia, till it enters the realm of perpetual snow, it will maintain this character. When these northern countries shall become more thickly populated and the dense forest shall be cleared off, affording better chances for examining their geological formation, we may look for a rapid extension of the gold and silver mining industry in that direction.

The third field indicated by Mr. Phillips as likely to receive attention and reward investment, consists of the Wasatch mountains, with their outlying ranges, which possess all the advantages of the various granitic and the older secondary formations. In some parts these mountains will be favorable for the production of the precious and in others of the base minerals, it being also probable that moderately thick deposits of coal and iron will be found in the central basins lying between these and the Rocky mountains.

The fourth field in this chapter pointed out comprises the Rocky mountains, trending north through New Mexico, Colorado, Wyoming and thence on into the British Possessions. The easterly slopes of this range, facing vast plains formed by the alluvials of all ages, will present constant variations, rendering it probable that the metallic minerals will be found along them only at long intervals, accordingly as local strata may encourage their presence. Heavy and frequent beds of coal may also be looked for at variable distances towards the east and at points remote from metamorphic action.

In strongly directing the attention of prospectors to these remote and then little known regions, Mr. Phillips has shown an intimate acquaintance with their geological conditions, since it was from these and not from any special fore-knowledge that he was able to predict the events that, since transpiring in these several districts, have largely verified opinions advanced by him so long ago.

The Proposed New Territory.

According to the bill now before Congress providing for the new Territory of Lincoln, the latter will comprise within its limits 97,800 square miles. Of this domain, 76,200 will consist of a portion of the present Territory of Dakota; 14,400 being taken from Montana and 7,200 from Wyoming. As constituted, it will be larger than any of the Western States, and will contain within its borders over 600 miles of navigable rivers, and more than 2,000 miles of river valleys. The present estimated population is 25,000. The friends of the measure have represented that there is more gold in this Territory than in California. During the past year there were 175 steamers unloaded at Bismarck, and more than 500 teams were constantly employed during the year carrying freight to the Black Hills.

PASSED OVER THE VETO.—The Governor's message vetoing the claim of A. A. Green for \$20,000 for services in establishing a title to San Francisco pueblo lands was taken up, and the bill passed over the veto by a vote of 18 to 5.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: California, March 27th, \$352,837.68; Con. Virginia, 27th, \$240,451.90; Standard, 26th, \$17,314.08; Northern Belle, 25th, \$2,139.70; Chollar, 27th, \$902.40; Tybo Con., 25th, \$9,710.49; Hussey, 29th, \$5,188.00; Manhattan, 29th, \$15,136.12; California, 30th, \$232,787.58; Con. Virginia, 30th, \$242,491.71; Northern Belle, 27th, \$2,024.57; Tybo Con., 27th, \$5,034.72; Christy, 31st, \$6,075.00; Manhattan, April 1st, \$15,783.03; Northern Belle, March 30th, \$3,091.25; Justice, 30th, \$7,001.10; Grand Prize, April 2d, \$14,000; California, April 1st, \$214,231.09; Con. Virginia, 2d, \$168,747.94; McCracken, 2d, \$18,550.38.

TEXAS is a nice State for people to emigrate to. It now has \$90,000 in rewards offered for the apprehension of 300 murderers and advertising for the arrest of 450 other murderers, whom it is not willing to pay anything for. It also has 750 indicted horse-thieves at large, and in addition to these murderers and horse-thieves, advertises for 2,900 other fugitives from justice. A State like that requires quite a stream of immigration to keep it from becoming depopulated.

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We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

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Testing and Working Silver Ores.

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has just been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope:

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working same, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchou's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles, Smelting, Mexican process, Chilean process, Kroebe's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a mill mill, sampling tailings and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

The book is a serviceable one for miners and prospectors' use. Price, post free, \$2.00. Address Dewey & Co., MINING AND SCIENTIFIC PRESS, 202 Sansome Street, San Francisco.

Copp's Hand-Book of Mining Laws.

Henry N. Copp's hand-book of mining laws, just issued, contains the United States mining laws and instructions thereunder, a digest of decisions, forms, list of mining patents issued, etc. The digest of decisions alone is a very valuable thing, giving, as it does, in brief form, all the decisions of the Secretary of the Interior and Commissioner of the General Land Office in relation to mining matters. These are all under proper headings for easy reference. Forms are given for notice of location, proof of labor, notice of forfeiture, miners' lien, application for survey, patent, etc., affidavit of improvements, etc. There is also a list of patents issued for mining claims from July 26th, 1866, to August 1st, 1877. The book is of pocket size and very convenient for all who are interested in mines. It will be sent post-paid for \$1, on application to Dewey & Co., 202 Sansome Street, San Francisco.

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THE CLIMATE OF CALIFORNIA.

A thoroughly studied and ably written treatise on this subject by H. B. Redding, appears complete in the PACIFIC RURAL PRESS for January 26th, and also the MINING AND SCIENTIFIC PRESS. Based upon facts, figures and careful and extensive observations made in various parts of the State on this important subject, it is a volume of reliable information, interesting to every resident of the State. The information is condensed in a paper read before the California Academy of Sciences, and is published in the Press as read before that Society without any alterations or omissions. Extra copies, post-paid, 10 cents. Address DEWEY & CO., Publishers, 202 Sansome Street, San Francisco.

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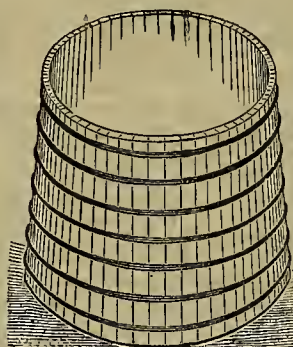
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The owner has also about 40 head of Cattle, a few Sheep, five horses, 150 head of hogs, 100 Hens, and a large supply of all necessary Farming Utensils, which he will dispose of to the purchaser at very reasonable terms if desired.

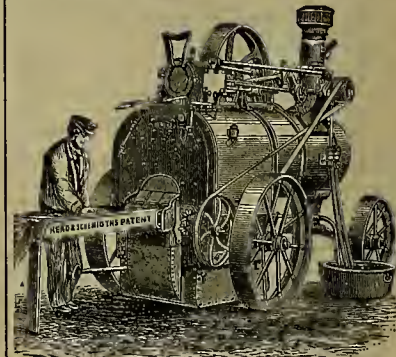
The neighborhood is as good as could be desired, only one mile from a store and one-half mile to a good schoolhouse, as well as one-half mile from a church.

The owner's reasons for selling are his wife's health and his dislike of the business. At the price at which it is offered it is the cheapest ranch in Mendocino County, as the crop bids fair to be worth when harvested, \$4,000. Terms are \$3,000, one-half cash and the balance secured by a mortgage at one per cent. For full information, address

DEWEY & CO., 202 Sansome Street,

SAN FRANCISCO, CAL.

STEAM ENGINES AND BOILERS.



One new Straw-burning Portable Engine, made by Ransome, Sims & Head, Ipswich, England. This is a very superior engine, sent here as a sample engine for exhibition; one second-hand Straw-burning Engine, 8x10 inch cylinder, (Rice); one second-hand Wood-burning Engine, 8x12 inch cylinder, (Hoadley); one second-hand Wood-burning Engine, 7x10 inch cylinder, (Hoadley); one second-hand Wood-burning Engine, 6x10 inch cylinder, (Hoadley); one second-hand Wood-burning Engine, 6x12 inch cylinder, side engine; one new Stationary Engine, independent cut-off, 12x24 inch cylinder. (The Straw-burning Engines named are free from infringements.)

One large sized Rock Breaker, Varney & Rix, size 9x15; one Wood Splitting Machine; one 36-inch cylinder Russel Separator, (with extra cylinder), and Laufenberg shoe—very cheap, on account of owner's death; (will be sold with or without any of above engines.) All of the above second-hand engines have been in shop and overhauled, and are in good working order. Various other machinery for sale. Purchase made on Commission. Machinery repairs solicited. Specialty of Portable Engines and Boilers for threshing.

J. W. RILEY, (Box 2361) San Francisco.

ANNOUNCEMENT.

SAN FRANCISCO, JANUARY 1st, 1878.
We beg to inform you that on the 12th of the present month, Mr. Selon H. Williams, will be admitted as Junior Partner in our firm. The style and title of the new firm will then be Spaulding, Barto & Co.

Mr. W. has been connected with our establishment for several years past, and in introducing him, we trust that he will receive your confidence and respect.

In the future, as in the past, we will endeavor to give satisfaction to all those who favor us with their orders; and, as we have just added a large assortment of the latest and most beautiful founts of type to our already large stock, we are prepared to do any and all kinds of plain and fancy Job and Book work at Low Prices.

Soliciting a continuance of your favors, we are, yours respectfully,
SPAULDING & BARTO.

EDWARD DUFFY and William R. Leehy were killed in the Ophir mine last week, by an explosion of giant powder. They were drilling with Burleigh, and struck a cartridge that had failed to explode when a round of holes was previously red.

forwarded from the lower provinces, and the country east and west is being searched for suitable horses for war purposes.

A TWENTY-STAMP quartz mill arrived at Victoria from San Francisco on Saturday, en route to the Cariboo mines.

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING, MARCH 19TH.
FLUME.—R. H. Campbell, Red Bluff, Cal.
MODE OF BUNCHING LUMBER FOR RUNNING THROUGH V-SHAPED FLUMES.—N. P. Chipman, Red Bluff, Cal.
SAW-MILL HEAD BLOCK.—W. H. Ahrams, Eugene City, Oregon.
APPARATUS FOR THE PRODUCTION OF HOT AIR.—E. Morean, S. F.

LABELS.
SALVE.—W. S. Halpruner, S. F.
 —The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.
 Note.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

The English Patent Seal.

Our English agent writes us from London the pleasing news that the great seal is, since March 1st, a simple wafer, and that the English patent may now be sent by mail at a trifling expense.

Wax was first applied to documents about the year 1213, an age when people were not addicted to correspondence by mail, and when a seal conveyed more of an impression to ordinary persons than written words. When the English government began to issue patents, they considered an essential feature of the document to be the seal; in fact, so much more essential than the document, that the wax overshadowed the parchment. With the characteristic conservatism of our friends over the water, the preponderance of seal has maintained ever since, and the principal idea most people have of an English patent is a tin box full of wax, with a little place left for the parchment.

Some radical has got into power of late, however, who has realized the fact that it is within the bounds of possibility that the letters patent may be just as effective without the five pounds of wax attachment, and that a wafer will represent the formality without the incumbrance; and that, moreover, with the wafer alone the patent papers may be sent by post, whereas before it could not, on account of the weight of seal.

The time honored and respectable seal has therefore given way to modern innovation and the light and equally formal wafer with the seal impression has taken its place, much to the delight of inventors; and we have no doubt but that our announcement of the fact will be hailed with joy by those who have procured English patents and desire to procure others. The size of the seal formerly used has been a matter of astonishment to those seeing it for the first time, but it has been a custom so long in vogue that it was probably somewhat difficult to find official recognition of anything else in its place. However, it is gone, and its absence shows a step in advance in English patent matters, which, it is hoped, will be continued until it costs as little to take out an English patent as it does an American one.

Trade Marks.

The last number of the official gazette of the United States Patent Office which has come to hand, gives the Commissioner's decision in the trade mark case of an appeal from the decision of the Examiner of Trade Marks in the matter of the application of Geo. Lisner, for the registration of the trade mark, "Palais Royal." The applicant designated the class of merchandise on which he used his mark as "fancy goods," and did not limit himself to any particular description of goods comprised in such class, but described how he proposed to apply it to "gloves" and some other fancy articles.

Although the practice of the office has been and is to admit registration of a trade mark to be applied to an entire class of merchandise, as "paints," or "alcoholic spirits," yet this privilege has not been extended to admit under one registration several classes of merchandise. The term "fancy goods," the Commissioner considers, has no well-known or ascertained meaning, and is even a more comprehensive term than groceries or dry goods. The objection is, therefore, not that a whole class of goods is specified, but that no substantial limitation is made.

It has been decided accordingly, that "no more than one class of merchandise can be entered at a single registration of a trade mark."

"Fancy goods" does not definitely ascertain any one class of merchandise; hence, registration of trade mark refused until the particular class was more clearly specified.

WOODWARD'S GARDENS has the following new attractions: The buffalo chase; large whale skeleton; new museum; improvements in the zoological department, besides the other features which have made it popular.

METALS.

[WHOLESALE.]

WEDNESDAY, M. April 3, 1878.

IRON.		
American Pig, ton.	23 00	@ 30 00
Scotch Pig, ton.	23 00	@ 30 00
White Pig, ton.	23 00	@ 30 00
Oregon Pig, ton.	21 00	@ 30 00
Refined Bar.	5 00	@ 34
Horse shoes, keg.	5 00	@ 34
Nail Rod.	—	@ 71
Norway, Oval.	—	@ 71
COPPER.		
Sheathing, lb.	34	@ 35
Sheathing, Yellow.	21	@ 35
Sheathing, Old Yellow.	21	@ 35
Composition Nails.	24	@ 35
Composition Bolts.	24	@ 35
STEEL.		
Flat Cast, lb.	13	@ 14
Anderson & Wood's, ordinary size.	15	@ 14
Drill.	15	@ 14
Flat Bar.	14	@ 19
Flow Sheet.	8 1/2	@ 19
TIN PLATES.		
10x14 1/2 O. Charcoal.	7 50	@ 8 50
Bacon Tin.	23	@ 24
Australian.	17	@ 17 1/2
ZINC.		
By the Cask.	9	@ —
Zinc Sheet 7x3 ft. 7 to 10, lb.	9	@ 10
7x3 ft. 11 to 14.	10	@ —
8x4 ft. 8 to 10.	11	@ —
8x4 ft. 11 to 10.	11	@ —
NAILS.		
Assorted sizes.	3 15	@ 25
QUICKSILVER.		
By the lb.	43	@ 45

LEATHER.

[WHOLESALE.]

WEDNESDAY, M. April 3, 1878.

Sole Leather, heavy, lb.	25	@ 29
Light.	22	@ 24
Jodot, 8 Kil. doz.	25	@ 36
11 to 13 Kil.	30	@ 36
14 to 19 Kil.	30	@ 36
Second Choice, 11 to 18 Kil.	55	@ 60
Comellian, 12 to 18 Kil.	57	@ 60
For Linings, 12 to 18 Kil.	57	@ 60
14 to 18 Kil.	71	@ 75
Simon Ulmo, Females, 12 to 13 Kil.	58	@ 60
14 to 15 Kil.	58	@ 60
16 to 17 Kil.	72	@ 74
Simon, 15 Kil.	60	@ 60
20 Kil.	65	@ 60
24 Kil.	72	@ 74
Robert Calf, 7 and 9 Kil.	35	@ 40
King French, lb.	1 00	@ 1 35
Cal. doz.	40	@ 60
French Sheep, all colors.	8	@ 15
Eastern Calf for Backs, lb.	1 00	@ 1 25
Sheep Roams for Topping, all colors, doz.	9	@ 13
For Linings.	5 50	@ 10
Cal. Russet Sheep Linings.	1 75	@ 4 50
Boot Legs, French Calf, pair.	4 00	@ —
Good French Calf.	4 00	@ 4 75
Best French Calf.	5 00	@ 5 25
Leather, Harness, lb.	33	@ 38
Fair Bridle, doz.	48	@ 60
Skitting, lb.	33	@ 37
Well, doz.	30	@ 60
Buff, lb.	18	@ 20
Wax Side.	17	@ 18

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]
 SAN FRANCISCO, April 3, 3 P. M.
LEOAL TENDERS in S. F., 11 A. M., 99@99 1/2. **SILVER**, 2.25@2.50. **GOLD** in New York, 101.
GOLD BARS, 89@91. **SILVER BARS**, 8@15 1/2 cent. discount.
EXCHANGE on New York, 1 1/2; on London bankers, 49@49 1/2. Commercial, 50; Paris, five francs @ dollar; Mexican dollars, 35.
LONDON Consols 95 7/16; Bonds, 105 1/2.
QUICKSILVER in S. F., by the flask, # lb, 46@47 1/2.

Signal Service Meteorological Report.

Week Ending April 2, 1878.									
HIGHEST AND LOWEST BAROMETER.									
Mar. 27	Mar. 28	Mar. 29	Mar. 30	Mar. 31	Apr. 1	Apr. 2			
29.64	29.93	30.04	30.15	30.22	30.21	30.06			
29.61	29.67	29.99	30.05	30.17	30.03	29.05			
MINIMUM AND MAXIMUM THERMOMETER.									
58	53	82	59	62	87	61			
51	49	50	50	50	52	52			
MEAN DAILY HUMIDITY.									
68	72	62	70	65	68	77			
PREVAILING WIND.									
S	NW	SW	NW	W	W	W			
WIND—MILES TRAVELED.									
255	250	214	182	190	142	203			
STATE OF WEATHER.									
Fair.	Fair.	Clo'dy.	Clear.	Clear.	Clear.	Clo'dy			
RAINFALL IN TWENTY-FOUR HOURS.									
.37	.02	.15	.18						
Total rain during the season, from July 1, 1877, 34.05 in.									

For the Paris Exposition.

The Committee on Minerals for the Paris Exposition announce that everything not in by the first of April will be left behind. It is likely that many mineral specimens intended for the great show will not reach here by that time, and as there are probably other things yet to be sent forward, it may be worth while to state that the American European Express, Baldwin Bros. & Co., Proprietors, 72 Broadway, New York, forward packages to the Paris Exposition at the following special rates: Four lbs., \$1.25; 8 lbs., \$1.50; 12 lbs., \$2.25; 20 lbs., \$3.25; 50 lbs., \$4.25; 75 lbs., \$5; 100 lbs., \$5.50, and for everything over three feet, 95 cents per foot. Custom expenses at Havre, 60 cents additional, per package. Freight in all cases to be prepaid.

TESTING AND WORKING SILVER ORES.—This is the title of an illustrated work of 114 pages, for Miners and Prospectors, by Chas. H. Aaron, published by Dewey & Co. It is written for miners, in plain language, and with all necessary details in description. The author describes the different processes of roasting ores, the appliances, methods of testing ores, testing for a process, working samples, treatment of minerals, the toll of chemical analysis, processes, different kinds of crushing apparatus, etc. This little work abounds with useful hints to miners and prospectors, and is written in a practical style. Price, post free, \$2.00. Address, Dewey & Co., MINING AND SCIENTIFIC PRESS, 224 Sansome St., San Francisco.

MINING AND SCIENTIFIC PRESS. \$4 a year. Published weekly at San Francisco, Cal. Our western friends will find this the most readable of papers, it being filled with full of good things. We are always anxious to read each number.—*Indianapolis Mechanical Journal.*

Mr. W. J. WOOLLEY, who took out a Canadian Patent some four years ago, is requested to call at the MINING AND SCIENTIFIC PRESS PATENT AGENCY OFFICE. Business of importance.

ANY PHOTOGRAPHER having a large Camera Box for sale will please notify "N. S." at this office.

MODEL MAKER AND MACHINIST.—I. A. Heald, No. 514 Commercial St., San Francisco, (fourth floor).

Hand-Book of Arizona Territory,

by RICHARD J. HINTON,

(Of the San Francisco Evening Post.)

This volume is now ready. It is a large 12mo. of 530 pages, accompanied by a

NEW MAP OF THE TERRITORY,

Compiled expressly for this work. This is the best map of Arizona yet published, and gives the latest mining districts. The volume will be profusely illustrated, containing full page lithograph views of the Loop, at Telchape, on the S. P. R. R.; Yuma, Prescott, Phoenix, Florence, Tucson and Tubac; the ancient church of San Xavier del Bac, ruins of the Tumacacori Mission and of Mount Wrightson, and other views of the Santa Rita Mountains, Calabazas, in the valley of Santa Cruz; Coronacion Peak, the Arivaca Valley and the ruins of Casa Grande.

Also, numerous other engravings of mines and scenes, comprising Mineral Park, Fort Whipple, Castle Dome, Oatman Flat, the Rio Verde Valley, Montezuma's Well, the Salt River Ruins, Indians, Public Buildings, Ancient Ruins and Rencillas, etc. In addition to these illustrations, the Hand-Book will contain

An Old Spanish Map of Arizona

And contiguous Territory, never before published; a copy of the famous Father King Map, and profile maps of the Mining District of Mohave County, in which the McCrackin mine is located; of Castle Dome District, Yuma County; of the Bradshaw District, near Prescott, where the Peck mine is worked; of the Pioneer, in which the famous Silver King is located; the Globe, where the Wheatfield, Stonewall Jackson and Miami mines are found; and of the extraordinary rich Santa Rita Districts, the Aztec and Tyndall.

The letter press will be crammed with valuable information, interesting description and accurate data as to the resources of Arizona—its geology, mineralogy, mines, mining, agriculture, etc.; also, of its roads, routes, fares, etc. Its historical chapter will be invaluable; and those on the Ancient People and Ruins of Arizona, as well as on the Jesuit Missions, Indians, etc., will prove of absorbing interest.

This is the most complete work on a new Territory or mining region ever issued. It is the result of conscientious observation and study, the author having made extended tours through the Territory, and being also in possession of the note-books of mining engineers and explorers, who spent years in examining this marvelous country, which is soon destined to be recognized as the Richest Silver Bearing region on this Continent.

The Hand-Book of Arizona

Will be handsomely printed, profusely illustrated, bound in flexible covers, and sold at retail for \$2 each.

HINTON'S NEW MAP OF ARIZONA,

Handsomely colored and mounted, now ready for delivery. Retail, on rollers, for the wall, \$2.50 each; in covers, \$1.50 each.

Liberal deductions made for the trade. Address

PAYOT, UPHAM & CO.,

Publishers and Wholesale Stationers, 204 Sansome Street, San Francisco, Cal.

Also, for sale at the above prices by

DEWEY & CO.,

Publisher of the MINING AND SCIENTIFIC PRESS, S. F.

SETTLERS and others wishing good farming lands for sure crops, are referred to Mr. Edward Frisbie, of Anderson, Shasta County, Cal., who has some 15,000 acres for sale in the Upper Sacramento Valley. His advertisement appears from time to time in this paper.

WANTED. A position by an experienced Mining

Superintendent, who has had experience in the Comstock and Grass Valley mines. Satisfactory reference furnished. Address "Mining Superintendent," this office.

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where he principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this act at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recognize the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Cataract and Wide West Hydraulic Gravel

Mining Company.—Principal place of business, San Francisco, California. Location of works, Echo Mining District, Calaveras County, California.
 Notice is hereby given, that at a meeting of the Board of Directors, held on the fifth day of March, 1878, an assessment (No. 1) of fifteen (15) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at the office of the company in the rooms of Doctor Floto, 402 Kearney Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the eighth day of April, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the twenty-ninth day of April, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

JOHN HOWARD CAREY, Sec'y.
 Office, (in rooms of Doctor Floto), 402 Kearney Street, San Francisco.

Excelsior Silver Mining Company.—Prin-

cipal place of business, San Francisco, Cal. Location of works, Potosi District, Lincoln County, Nevada.
 Notice is hereby given that at a meeting of the Board of Directors, held on the fifth day of March, 1878, an assessment of forty cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin to the Secretary, at the office of the Company, 27 Market Street.

Any stock upon which this assessment shall remain unpaid on the sixth day of April, 1878, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the twentieth day of April, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

FRANCIS P. DEVINE, Sec'y.
 Office, 27 Market Street, San Francisco, Cal.

Manzanita Consolidated Gravel Mining

Company. Location of principal place of business, San Francisco, Cal. Location of works, Nevada County, Cal.
 Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the nineteenth day of February, 1878, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Am't.
John M Fulweiler.....	1	5000	1250 00
John M Fulweiler.....	2	5000	1250 00
John M Fulweiler.....	3	1000	250 00
John M Fulweiler.....	4	1000	250 00
John M Fulweiler.....	5	1000	250 00
John M Fulweiler.....	6	125	31 25
Thomas J Owens.....	7	5000	1250 00
Thomas J Owens.....	8	5000	1250 00
Thomas J Owens.....	9	5000	1250 00
William Thorpe.....	14	100	25 00
DeWitt C Jones.....	15	100	25 00
Ferdinand Vassault.....	20	1000	250 00
Ferdinand Vassault.....	21	1000	250 00
Ferdinand Vassault.....	22	100	25 00
D W C Jones, Trustee.....	23	1000	250 00
D W C Jones, Trustee.....	24	1000	250 00
D W C Jones, Trustee.....	25	1000	250 00
D W C Jones, Trustee.....	26	1000	250 00
D W C Jones, Trustee.....	27	1000	250 00
Jno F Pope, Trustee.....	28	1000	250 00
Jno F Pope, Trustee.....	29	1000	250 00
Jno F Pope, Trustee.....	30	1000	250 00
Jno F Pope, Trustee.....	31	1000	250 00
Jno F Pope, Trustee.....	32	1000	250 00
Chas W Brush, Trustee.....	37	1000	250 00
Chas W Brush, Trustee.....	38	200	50 00
Chas W Brush, Trustee.....	39	200	50 00
Chas W Brush, Trustee.....	40	200	50 00
Chas W Brush, Trustee.....	41	200	50 00
Chas W Brush, Trustee.....	42	200	50 00
Chas W Brush, Trustee.....	43	200	50 00
Chas W Brush, Trustee.....	44	200	50 00
Chas W Brush, Trustee.....	45	200	50 00
Chas W Brush, Trustee.....	46	200	50 00
Chas W Brush, Trustee.....	47	200	50 00
Chas W Brush, Trustee.....	48	200	50 00
Chas W Brush, Trustee.....	49	200	50 00
Chas W Brush, Trustee.....	50	200	50 00
Chas W Brush, Trustee.....	51	200	50 00
Chas W Brush, Trustee.....	52	200	50 00
Chas W Brush, Trustee.....	53	200	50 00
Chas W Brush, Trustee.....	54	200	50 00
Chas W Brush, Trustee.....	55	100	25 00
Chas W Brush, Trustee.....	56	100	25 00
Chas W Brush, Trustee.....	57	100	25 00
Chas W Brush, Trustee.....	58	100	25 00
Chas W Brush, Trustee.....	59	100	25 00
Chas W Brush, Trustee.....	60	100	25 00
L Harris, Trustee.....	74	1875	468 75

And in accordance with law, and an order of the Board of Trustees, made on the 19th day of February 1878, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the company, room 8, No. 215, Sansome street, San Francisco, Cal., on the 15th day of April, 1878, at the hour of 12 o'clock M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

THOS. J. OWENS, Sec'y.
 Office, room 8, No. 215 Sansome street, San Francisco, California.

Summit Mining Company.—Location of

principal place of

Iron and Machine Works.

THOS. PENDERGAST.

HENRY S. SMITH.

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

OF ALL KINDS.

Fremont Street, Bet. Howard and Folsom,

SAN FRANCISCO.

PHELPS MANUFACTURING COMPANY,

Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

13, 15 & 17 Drumm St., near California, SAN FRANCISCO, CAL.

SACRAMENTO BOILER WORKS,

214 to 218 BEALE STREET,

HALL & KELSHAW,

PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the lowest possible terms.

GOLDEN STATE & MINERS' IRON WORKS.

Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

UNION IRON WORKS, SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills' Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets, SACRAMENTO, CAL.

CALIFORNIA BRASS FOUNDRY,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE. J. H. WEEC. V. KINGWELL.

California Machine Works,

119 BEALE STREET, SAN FRANCISCO.

BIRCH, ARGALL & CO.,

Makers of QUARTZ, SAW AND FLOUR MILLS

Keating's Sack Printing Presses,

THE ECONOMY HYDRAULIC HOIST FOR STORES, AND General Machinists.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

J. HENDY, 49 and 51 Fremont Street, S. F.

THOMAS THOMPSON. THORNTON THOMPSON.

THOMPSON BROTHERS, EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

THESE LARGE, FINE, NEW DINING ROOMS are exceedingly popular. The best of everything on the tables. Dinner furnished at the low price of FIFTY CENTS, from five to eight P. M. Visitors to S. F. should try the Palace.

HAWKINS & CANTRELL, MACHINE WORKS,

210 and 212 Beale Street, bet. Howard and Folsom Sts., - - San Francisco.

Manufacturers of

IMPROVED PORTABLE

Hoisting Engines,

For Mining and Other Purposes.

Steam Engines and all Kinds of Mill and Mining Machinery.

Pacific Rolling Mill Co.,

SAN FRANCISCO, CAL.

MANUFACTURERS OF

RAILROAD AND MERCHANT IRON,

ROLLED BEAMS, ANGLE, CHANNEL AND T IRON, BRIDGE AND MACHINE BOLTS, LAG SCREWS, NUTS, WASHERS, ETC., STEAMBOAT SHAFTS, CRANKS, PISTONS, CONNECTING RODS, ETC., ETC.

Car and Locomotive Axles and Frames, and Hammered Iron of Every Description.

HIGHEST PRICE PAID FOR SCRAP IRON.

Orders Solicited and Promptly Executed.

Office, No. 18 FIRST STREET.

Fulton Iron Works.

Hinckley, Spiers & Hayes.

(ESTABLISHED IN 1855.)

Works, Fremont and Howard St. | San Francisco, Cal. | Office, No. 213 Fremont St.

MANUFACTURERS OF

Marine Engines and Boilers,

Propeller Engines either High Pressure or Compound Stern or Side Wheel Engines.

Mining Machinery.

Hoisting Engines and Works, Cages, Ore Buckets, Ore Cars, Pumping Engines and Pumps, Water Buckets, Pump Columns, Air Compressors, Air Receivers, Air Pipes.

Mill Machinery.

Batteries for Dry or Wet Crushing, Amalgamating

Engines and Boilers of all kinds, either for use on Steamboats and made in accordance with the Act of Congress regulating the same, or for use on land. Water Pipe, Pump or Air Column, Fish Tanks for Salmon Canneries of every description.

Boiler repairs promptly attended and at very moderate rates.

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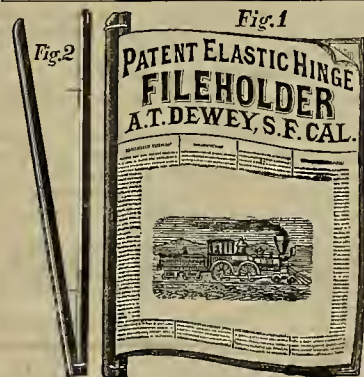
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GREENVILLE, PLUMAS CO., Oct. 16th, 1877. }

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Superintendent Gold Stripe Mine.

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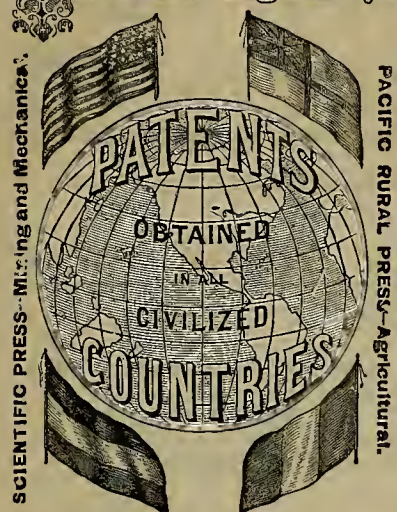
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SAN FRANCISCO, SATURDAY, APRIL 15, 1878.

VOLUME XXXVI.
Number 15.

New Geared Differential Pulley Blocks.

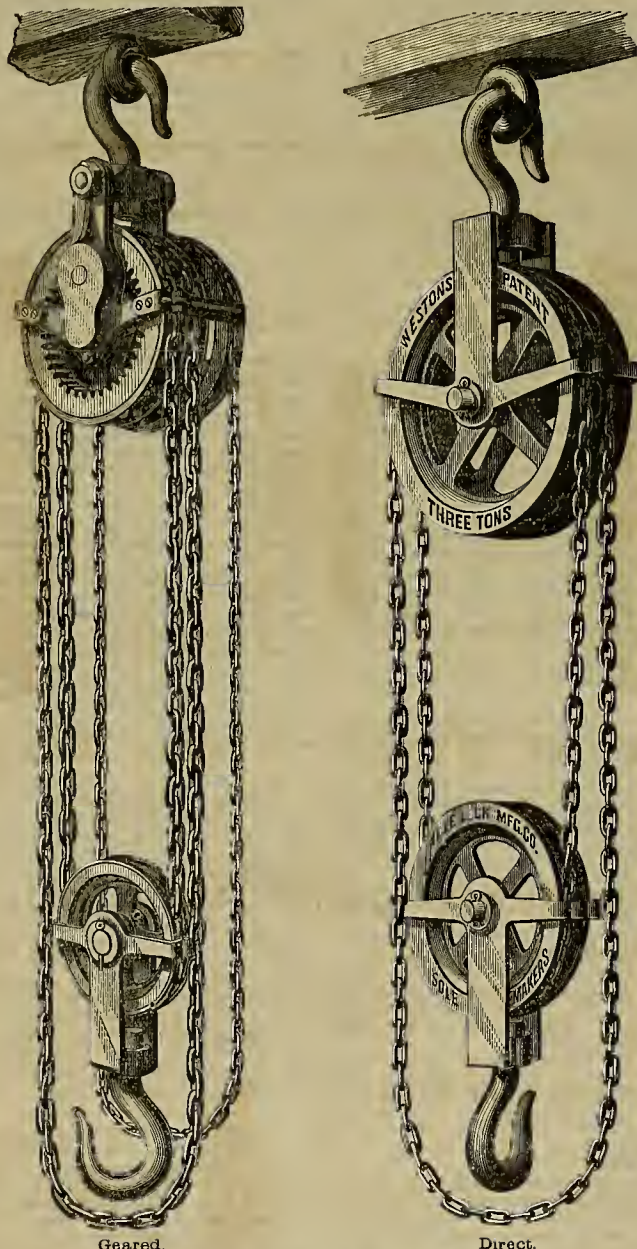
The differential pulley block is one of the most noticeable of the smaller mechanical inventions of the age. It met a want which had existed from the beginning of the mechanic arts. In nearly every mechanical operation, more or less handling of heavy weights is involved, and numberless contrivances have been devised for enabling such work to be done with ease, safety, and the employment of comparatively small power. The ordinary device in use all over the world is the common rope tackle and blocks, by the use of which the efficiency of a man, or his capacity to lift, is increased two, four or six fold, according to the number of sheaves in the blocks. This apparatus is of immense utility and is in universal use, but its multiplication of power is very limited, and its use necessitates provision against the "running down" of the loads suspended if the power be relaxed. The great value of the differential pulley block arises from the fact that in a block of even less compass than that of a rope tackle of corresponding capacity, a multiplication of power of from 30 to 300 fold is easily attainable, and its principle is such that the load suspended, no matter how heavy, can never run down or descend of itself, nor without the deliberate act of the operator.

The principle upon which the differential pulley block acts may be briefly explained as follows: The load is carried by an endless chain suspended from a double sheave or pulley at the top, and in turn supporting in its lower loop a single sheave or pulley to which the load is directly attached. The two sheaves or pulleys at the top are in reality formed of one piece of metal, and therefore revolve together, one of them being slightly smaller than the other. The two sides of the chain which pass around the lower sheave and thus carry the load, pass over different grooves in the top sheave—that is, one of them passes over the large groove of the top sheave while the other passes over the small one. It thus follows that when the top sheave is revolved in one direction the loaded part of the chain is being taken up on the large diameter, and given off (on the other side) on the small, so that the load is raised by the amount of difference between the length of chain taken up on the large pulley and the length given off on the small ones. In like manner, when the pulley is revolved in the opposite direction, more chain is given off from the large pulley than is taken up on the small, and the load descends in proportion to the amount of this difference.

Since its invention by Mr. T. A. Weston, the direct differential pulley block has gone into most extensive use in all parts of the world, but its application is limited to the handling of weights of less than three tons, beyond which its size becomes too unwieldy and the power required to operate it too great to admit of its advantageous employment. The object of Mr. Weston's recent improvement is to extend the utility of the differential pulley block to the handling of weights of from 3 to 10 tons, or, if necessary, even greater ones. This has previously been done to a limited extent by the employment of large sprocket wheels and gearing, but only in such form as to be almost useless for practical purposes. Mr. Weston, however, has succeeded in combining with this regular differential block a system of gearing so compact and so powerful as to give all the desired increase in the efficiency of the block, without practically increasing its bulk or weight. Indeed, as may be seen from the accompanying illustrations showing two 3-ton blocks, one of them of the direct or old style and the other of the new geared pattern, both drawn to the same scale, the bulk of the new block is even less than that of the old, while its weight is but very slightly greater. In the geared block, power is applied for hoisting or lowering by means of a hand chain which passes over a third sheave on the upper block, and as this chain is in no way connected with the load, the operator may stand at quite a distance from the load if necessary, which is sometimes a matter of con-

siderable convenience. With the plain or direct differential pulley blocks, 1,000 pounds is the maximum load which can be lifted by one man, while with the new pattern of geared blocks the efficiency of one man is increased so that he can lift from 2,000 to 4,000 pounds. This increased efficiency not only enables the blocks to be used for handling much heavier loads, but also makes the smaller sizes of the blocks available for use in places where the load to be lifted is more than can be conveniently handled by the number of men available for the purpose.

well boxed in, is the plain spur gearing, which is of steel. In the ordinary differential pulley blocks, the hauling chain continually varies in length as the load is moved, sometimes trailing on the ground, which does not occur in the new form, the hand-chain being a separate endless one of unvarying length, and the improved yokes or frames renders impossible the twisting of the chains or their displacement from the sheaves. The machine is always ready for use, only needing to be oiled, and it is believed that in its class it comprises the maximum of com-



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When hoisting a load the main sheave, or differential sheave, turns slowly upon its own stationary shaft, through which passes concentrically the driving shaft, carrying a sprocket wheel and the endless hand-chain for rotating it. The concentric arrangement of the shaft gives compactness and ample wearing surfaces. The sprocket wheel does not exceed in diameter the main or differential sheave, the latter having the smallest diameter allowable for the proper durability of the chain under the continuous process of coiling and uncoiling. The small sprocket wheel is placed snugly up to one side of the main sheave, and at its opposite side,

compactness, durability and efficiency, with moderate cost.

As applied to machine shop work this pulley is of daily value. A mechanic can, without assistance, adjust heavy weights in his laths, and alter their position by means of a traveler. The general utility of this pulley, and the many different ways in which it can be applied, render it very useful for agricultural purposes, as, for instance, in pulling up stumps, or raising heavy stones. One man can accomplish more work with one of these pulleys than half a dozen could without it. These pulleys may be seen at Dunham, Carrigan & Co., agents, S. F.

Constitution Makers.

The State is now preparing for the choice of delegates to the Constitutional Convention. The people have been looking forward to this convention as the tribunal which shall right wrongs and curb abuses which act as a brake upon our industrial progress. The recent Legislature laid aside consideration of numerous important matters, because a higher power than a legislature has been invoked by the people. This people had appealed to Caesar and to Caesar they must go. This was the right view to take of the matter, and if the State is true to itself in the selections which will soon take place, there will be found sovereign relief for wrongs and a favoring aegis beneath which our State will enter a new era of industrial prosperity and progress. Everything depends upon this choice of representatives which will soon be made. A right choice will be a permanent blessing; a wrong choice will either be a disappointment or a curse. It is true that the people have the power either to accept or reject the work of its representatives, but it is none the less desirable that they should make assurance of acceptable work, for, if this be not secured, the hard-earned money which this convention will cost might as well be cast into the hay. What is the work to be done and what are the qualifications for doing it?

What is a constitution? It is the highest form of written law. It is the essence of justice. It is the epitome of this life and health of the State. It is the instrument by which the highest tribunals of justice must measure their decisions. It is the final test of the truth of all legislative enactments. It is the surety under which the highest citizen holds his position and his emoluments; it is the protection by which the humblest citizen guards his labor and his home. It is the nerve of industry. It is the vital point of popular existence which no poison can enter without resulting injury to the humblest member of the body politic. As peoples have advanced in civilization and enlightenment, their constitutions have advanced in the scale of universal justice and in truer regard for the rights of men. The constitution which is true to this age, is indeed a bulwark of liberty; a cornerstone of justice; a keystone which holds in true relation all the corporate and individual rights of citizens.

Such being the fact, the question arises, who shall make a Constitution? Evidently they must be men who know the right and can zealously maintain it. Men who can discern the truth in principle and in its practical workings in the affairs of life. They must be men of unsullied integrity; men with whom we would trust all our personal interests if we needed a custodian for them. Men of whom we say: "His word is as good as his bond"—men who are far above the suspicion of wrong-doing, whose whole intercourse with men has spread abroad throughout this community a feeling of confidence in them. But the quality of honesty and integrity alone will not suffice. To honesty there must be added the highest and widest intelligence.

In addition to abstract ideas and perceptions of right and wrong in principle, there must be represented in the convention a full acquaintance with our material interests and the causes affecting their development. It would be well that the steps of progress which our State has made should be constantly in mind, for from them, in many cases, may be learned the true course toward needed reforms.

Such considerations as these, and many others allied thereto, should enter into our judgment when we come to delegate men to make a new Constitution for us. We have made no allusions to particular interests, for these will doubtless assert themselves in all minds.

COPPER ORES FROM CHILE.—Mr. Henry Sewell, M. E., has a fine collection of Chilean copper ores brought by him recently from that country. They are on exhibition at his office, 318 Pine street, room 34, where any interested can examine them.

European Estimates of American Scientific Work.

The following letter, written from Rome, by Hon. Geo. P. Marsh, our Minister to Italy, and one of the most profound scholars of the age, will be read with interest by our people. It shows the favorable change which has been going on in Europe, in their estimation of American scientific men, within the last 10 years:

Dr. F. V. Hayden—Dear Sir:—I have to thank you for several of the bulletins of the survey and especially for the U. S. Geological and Geographical Survey of Colorado and adjacent territory for 1874, which I received last week, and which I have read with extreme interest and satisfaction. The publication and diffusion of the results of the Government surveys of our vast territory west of the Mississippi, have been of very great service, by revealing to our countrymen the true character of that long unknown region, and thus guiding the restless energy of the American people in its search for new fields for the display of its spirit of enterprise and to our national position in European estimation, and disclosing our inexhaustible material resources, and, of course, power, and at the same time furnishing proofs of the enlightened liberality of our Government, and of a high degree of scientific ability in our explorers.

Until within a few years, American science was seldom spoken of abroad, except in a disparaging tone, but now the full equality of American astronomers, geologists, physicists, chemists and metallurgists is recognized by all the numerous European periodicals, devoted to these and other branches of natural knowledge, to the promotion of all of which these surveys have directly or indirectly contributed, and I have no doubt that their reports and those of other scientific expeditions and operations carried on under the patronage of the Federal Government, have done as much to secure to us the respect of the world as our military and financial successes.

The reports, for which I have the pleasure of thanking you, have been most favorably noticed in all the scientific journals and proceedings of philosophical societies to which I have access. The unexpected light which they have thrown on the ethnology and the obscure history of the native American races has excited great interest and a strong desire is everywhere felt for a further prosecution of these researches and for the publication of their results, which, of course, can be effected only by Government aid and which have already done so much to draw the attention of the thinking men of the old world to the unbounded field of curious inquiry which our territories offer to the scientific investigator. We alone can gratify this desire of the intelligent population of both hemispheres, and we shall not do our duty as members of the great commonwealth of knowledge if we suffer a narrow economy to prevent a continuation of work so well begun and so important to the general interests, material and moral, of the old world and the new. Wishing you generous encouragement and continued success, I am very truly yours,

GEORGE P. MARSH.

A REMARKABLE instance of effect of sea waves on masonry is furnished in the case of the well-known breakwater at Wick, on the coast of England. The height of the waves at this place was, it appears, several times measured and estimated, the result showing about 42 feet from crest to hollow. Stones of eight and ten-ton weight were, by these waves, carried from the parapet to the very top of the breakwater; and it was therefore determined, finally, to construct the outward extremity of breakwater by depositing three courses of 100-ton blocks of stone on the rubble base, as a foundation for three courses of large, flat stones, surmounted by a monolith of cemented rubble built on the spot. The end of the breakwater, therefore, was in substance a monolith, weighing upward of 800 tons, being about 26 feet by 45, and not less than 11 feet in solid thickness, cemented to the underlying rubble base. Incredible as it might seem, this huge monolithic mass succumbed to the force of the waves—it was, indeed, actually seen by the resident engineer to be boldly slewed around by successive strokes until it was finally removed and deposited inside the pier. Not only the upper portion, but the three lower courses of stone, forming a mass of 1,350 tons, were removed without breaking.

RAILROAD BUILDING IN NEW MEXICO.—The *Cimarron News and Press* reports that railroad work in the Raton pass, to the north, goes on apace. The Atchison, Topeka & Santa Fe company is evidently in earnest. A large party is at work in the mountains, and another will soon commence operations on the line further south, toward Cimarron. It is confidently expected that the road will be in running order on the New Mexico side of the Raton by next winter. The Denver and Rio Grande people, who have engaged to lead the broad gauge through New Mexico, have not yet commenced building operations, but are making a stir over preparatory movements, and have the advantage of being able to traverse the mountains with narrow gauge construction, much more rapidly than their competitors. The *News and Press* expects to have the iron horse in Cimarron soon.

The Way to Success.

How A. N. Towne Became Superintendent of the C. P. R. R.

We make an abstract from an article by Alfred L. Sewell, in a Chicago paper, which gives an account of the railway career of Mr. A. N. Towne, General Superintendent of the Central Pacific railroad, a gentleman well known throughout this coast. Mr. Sewell writes:

In the earlier years of my experience as a printer in Chicago, more than 20 years ago, our firm did a good deal of printing for the Chicago, Burlington & Quincy railroad, and, because of this, I came to know a young man who is the subject of my story. He came from Massachusetts, he was poor, and had no influential friend to even give him a letter of recommendation. He sought employment on the Chicago, Burlington & Quincy railroad, and, after waiting a time, at last secured a position as brakeman on a freight train—salary about \$30 a month. He was faithful in this position, and, being both intelligent and industrious, he was soon made conductor of the train, with wages nearly doubled. He attracted the attention of his superior officers, who saw in him an honest, faithful and conscientious conductor, one not seeking his own ease or pleasure, but constantly devoted to the interests of the company that employed him, so that not many months elapsed before he was made conductor of a passenger train—a more comfortable position, and one yielding a somewhat higher salary. Here I first knew him, and I saw in him a modest, quiet, unassuming young man, free from the popular vices, and one who tried to be just as faithful and true and devoted to his work as a conductor, as though the position had been that of General Superintendent.

One of the sternest and most exacting, and yet one of the noblest, ablest, and most conscientious men who ever filled a similar position was then General Superintendent of the road. This man, Col. C. G. Hammond, watched every employee of the road with an eagle's eye. He measured every man, knew the ability of each, and seemed intuitively to know which were the lazy shirks. Our young conductor did not escape the keen eye. When he least thought of it his chief was measuring and sounding him, and finding out what kind of metal he was made of; but none ever knew whether he was approved or not, for the chief's look was always stern and cold as ice.

One Saturday morning train No. 4 moved slowly out of Chicago under the care of my friend, who, only intent on doing his work as well as he knew how, seemed to have no higher ambition than to be a good conductor—salary, \$900 a year. About noon, when he stopped at a station, he found a telegram from the head office ordering him to "leave the train in the care of —, and take the first train for Chicago."

This was an unusual thing. Wondering what could be the matter; conscious that he had tried to do exactly right, and yet remembering how exacting was the General Superintendent, he feared that unintentionally he had fallen under his displeasure. With a fearful heart he presented himself at the office of the Superintendent.

"Good morning, Mr. Hammond; I have received your telegram and come to see what it means."

"Good morning," growled the chief, "I see you have, sir; I have concluded to take your train away from you."

The conductor's heart sunk lower than ever. What before was only fearful foreboding was now painful truth. He had served the company to the best of his ability. He had kept the affairs of his train in complete order, his reports had been carefully and correctly made; and yet, after all, he lost his position. He dared not hope to reverse the decision of the all-powerful official, yet in a calm voice as he could command, he politely asked the reason for his summary dismissal.

Col. Hammond waited a while before he answered. Then the muscles of his face relaxed a little, and he said: "I want an assistant superintendent in my office, and I have called you to take the place."

True worth is always modest, and our thunderstruck conductor could only stammer, "But I am not competent, sir, to fill the position."

"You can do what I tell you; you can obey orders, can't you? That's all you have to do, sir. You will begin work this morning. That is your desk."

The new duties were not as difficult as he expected. At first he had only to obey orders, and carry out the details of work laid out by the chief; and to these duties he brought the same faithfulness and thoroughness that had made him noticeable as a conductor. His elevation did not spoil him or make him vain. He was as plain and modest and hard-working as before—the salary at first was \$1,800.

After a few years' service under Col. Hammond, and an advance of salary to \$2,500, the plain young man was invited to take the office of general superintendent of a younger road at a salary of \$4,000. Distrusting his own ability, but determined to do his best, he accepted the call and succeeded, until the C. B. & Q., realizing how much they had lost in parting with him, invited him to resume his old position, and secured his services by the tempting offer of \$6,000 a year.

In the meantime, Col. Hammond had become the General Superintendent of the Union Pacific railroad, running from Omaha to Ogden, where it connects with the Central Pacific railroad. The Central Pacific road was owned by four or five millionaires who built it, one of whom was its General Superintendent. However good a business man he was, he knew but little about railroading.

But where could they find a General Superintendent who had the ability and would dare to reorganize the road and put the affairs upon a better basis? They consulted Col. Hammond and other railroad men, and the result was that, most unexpectedly, our whilom modest and hard-working conductor one day received a telegram asking him if he would undertake the duties of General Superintendent of the Central Pacific railroad at a salary of \$10,000. He was satisfied with and appreciated by the Chicago, Burlington & Quincy, who proposed to increase his pay to \$7,000, and as he preferred to remain in Chicago, he declined the princely offer made by the California road. Then another telegram asked at what salary he would become chief of the Central Pacific. Almost hoping to discourage his tempters he telegraphed, "\$13,000 a year in gold." At once came the answer, "Accepted." So, taken in his own trap, he had nothing to do but to bid adieu to the city that had served him so well, and turn his face toward the land of gold.

This was nine years ago. He is still General Superintendent of the Central Pacific railroad, one of the most important railroads in the world. With its connections in California, this quiet man, not yet 48 years old, now superintends 2,734 miles of railroad, and over connecting steamers, besides dictating the tariffs of the China, the Australian and the Panama lines of steamships. While other young men, preferring present ease and comfort to the interests of their employers, wasting money and time in billiard halls, theaters, and drinking saloons, Albion N. Towne was at work, building up character as well as reputation, and now fills one of the most important positions in California, and instead of \$360 a year, as a brakeman on a freight train, he now draws the comfortable salary of \$20,000 a year in gold.

"Lucky man," says one. "Luck" had but little to do with it. Modest worth did it. Work did it. Faithfulness in the performance of present duties, however humble, did it. This untiring faithfulness in the humbler duties not only attracted the notice and won the appreciation of his superiors, but fitted him for the higher positions which, without his seeking, he was called to fill.

ABOUT DUTCH FLAT AND GOLD RUN.—A blast of 300 kegs of powder was set off on Tuesday afternoon in the Franklin mine, and did splendid execution. Besides throwing down an immense quantity of dirt in fine condition for washing, it shook up the bank back for 150 or 200 feet so thoroughly that that also will come down at the first touch of the water. Mr. Teaff, the Superintendent, is successful with his blasts. The Gold Run hydraulic claim's clean-up last week was very satisfactory in result. The entire sum coming into W. & P. Nicholl's bank was \$5,337, for 22 days' run. Labor and water for the period cost about \$1,900, leaving a balance of \$3,437. A blast on Saturday last broke up some magnificent cement gravel, large pieces of which were afterwards found to be literally studded with gold. Every day increases the facilities for working to good effect in this claim, and consequently increases the prospect for better pay in the future.—*Dutch Flat Forum*.

CENTENNIAL MINE.—Another clean-up of ore from the Centennial mine was made at the Orleans mill, on Thursday last, of 61 loads, which yielded \$6,000, without including sulphurets, which are rich. This is certainly a splendid yield, and shows, as one of the stockholders remarked, that the Centennial "is the best little prospect in Nevada county." The ledge is quite narrow, but continues very rich, and will give more crushings of the same kind, as the rock is in sight to do it with. It is the belief of John Trenberth, the Superintendent, that the ledge will increase in size as greater depth is attained, and that the mine will become regular and reliable in its yield. The incline is to be sunk deeper the present season, after the surface water ceases to be troublesome.—*Grass Valley Union*.

THE PRECIOUS METALS.—As there has been considerable comment of late regarding the weight of the precious metals in avoirdupois, and for the benefit of the inquisitive, we give the following from an Eastern financial exchange: One ton, 2,000 pounds, avoirdupois, of gold or silver, contains 29,163 troy ounces, and, therefore, the value of a ton of pure gold is \$602,799.21, and a ton of silver, \$37,704.84. A cubic foot of pure gold weighs 1,218.75 pounds avoirdupois; a cubic foot of pure silver weighs 656.25 pounds. One million dollars gold coin weighs 3,658.8 pounds avoirdupois; \$1,000,000 silver coin weighs 58,929.9 pounds avoirdupois. If there is 1% of gold or silver in one ton of ore, it contains 291.63 ounce troy, of either of these metals.

GOLD DISCOVERED IN NEW GUINEA.—The first gold was discovered in New Guinea in November last. The climate is exceedingly unhealthy in the gold field, so there is little inducement for any one to go there.

Accumulation of Capital.

At a recent meeting of the London Statistical Society a paper was read by Mr. Robert Giffen on "Recent Accumulations of Capital in the United Kingdom." It appeared that the growth of these accumulations had been very rapid. The income tax returns showed that the gross income assessed rose in Great Britain from £115,000,000 at the beginning of the century to £130,000,000 in 1815, £251,000,000 in 1843, and £262,000,000 in 1853; and then, in the United Kingdom, from £308,000,000 in 1855 to £396,000,000 in 1865, and £571,000,000 in 1875. If the capital of that portion of the income derived from capital had only progressed at the same rate, the annual increase of capital all through, and especially of recent years, must have been enormous. The increase in the incomes assessed between 1865 and 1875 amounted to £175,000,000, which was equal to 44% of the income assessed in 1865. Leaving out altogether the capital not yielding income, a similar increase of capital, assuming the present amount to be what he had stated, would give for 1865 a total capital of about £5,200,000,000, on which the increase, at 44%, would be £2,282,000,000, or, in round figures, £230,000,000 per annum. Mr. Giffen observed that if his estimate was moderate and any cause would justify a higher figure for the present capital, then the increase between 1865 and 1875 would be even more than he had stated. A question which had been raised of late was whether the nation was now spending its capital. The figures in his paper might, he thought, be taken to prove that if the nation had begun to spend its capital instead of saving capital, the process was a very new one.

DITCHES AND PLACERS.—The *Black Hills Times* of March 26th, published at Deadwood, has the following: The Spearfish and Bear creek ditch, we learn from Mr. E. E. Fine, will be completed from the head of Beaver gulch to the placer diggings in Bear gulch, a distance of ten miles, by the 1st of May. The enterprise is half finished now. There are about six miles of placer ground in that district, which Mr. Fine thinks will prove as rich as any yet discovered in the Hills. Some of the finest specimens of nuggets found within the confines of this land of wonders have been unearthed in Bear gulch. One nugget from that section weighs over \$45. The only thing that has kept that country from being developed has been the lack of water, but this will now be overcome by the ditch, which will furnish that camp an unfailing supply from a cluster of springs at its head. The population of Bear gulch is being considerably augmented now-a-days by the return of claim owners, who have been out during the winter, and new comers. Times are more lively at present there than at any previous period since its settlement. The weather just now is pretty severe, raw cold winds and falling snow.

AIR-LINE ROAD TO MEXICO.—Representative Shelley, of Alabama, recently introduced a bill in the National House of Representatives at Washington, granting a charter to the New York and Mazatlan Air Line railroad, Telegraph, and Immigration company. It provides for the organization of a corporation to lay out and construct a continuous line of railroad and telegraph from New York to Fort McIntosh on the Rio Grande, via Washington city, [Richmond, Va., Atlanta, Ga., Selma, Ala., New Orleans, La., Houston, Texas, and Fort McIntosh], with the privilege of constructing and maintaining a branch line from about Charleston, S. C., to Norfolk, Va., subject to all the privileges and immunities of said grand trunk line. The capital stock is not to exceed \$200,000,000, and \$10,000,000 of that sum shall be subscribed in shares of \$1,000 each before organization. The bill authorizes the Secretary of the Interior to appoint five commissioners to act in conjunction with those organizing the corporation.

THE ST. GOTHARD TUNNEL.—Up to the first of the current month, 32,108 feet of the St. Gothard Tunnel had been perforated, 16,800 feet at the north (Goeschenen) end, and 15,308 feet at the south (Airolo) end. At present the work is rendered very difficult. On the north side for the last three months the borings have passed through serpentine, and on the south side through broken rock, which has required the greatest possible precaution to deal with. The mean progress has not lately exceeded 13 feet per day.

TOO MANY COAL MINES IN AUSTRALIA.—The *Sydney Herald*, of January 24th says: A deputation of delegates from the coal miners of Greta, Wallsend, and New Lambton, had an interview with the Colonial Secretary (the Hon. Michael Fitzpatrick), at his office, yesterday. They represented that there was great distress among the coal miners of the localities from which they came, the number of them being far in excess of the demand for their labor. Many of them could not obtain more than two days' work a week.

THE HOOSAC TUNNEL line recently shipped 128 quarters of fresh beef for Liverpool via steamer from Boston. The beef was loaded in refrigerator cars, and was delivered in Boston just 84 hours from Chicago to Boston. The company expects to do a large foreign business hereafter.

MECHANICAL PROGRESS.

Manufacture of Welded Iron Tubes.

In the ordinary method of manufacturing welded iron tubes or pipes, a plain strip of iron, or a skelp or strip bent more or less into a tubular form, is heated in a furnace to a welding heat, and, by the action of the rolls or other pressing machinery, the edges of the heated skelp are welded together. In this method of manufacture, the whole of the iron of which the tube or pipe is to be made is raised to a welding heat and grave inconveniences arise therefrom, especially in the manufacture of tubes made from thin strips or having little substance of iron in them. By the invention of Mr. Edward Roden, as described in the London *Mining Journal*, these inconveniences are avoided. Instead of heating the whole of the strip or skelp of iron, he heats only the edges which are to be welded together and the parts adjacent thereto. In order to effect this, he constructs a furnace, having a long, narrow opening at its top, and the strip of iron from which the tube is to be made having been bent into a tubular form, with its edges overlapping, is placed upon the said opening in the furnace, the said overlapping parts being alone exposed to the strongest heat of the furnace, while the greater part of the tube being external to the furnace, is but slightly heated. Near the end of the furnace a bulb mandril, supported on a rod, is situated, the axis of the said bulb mandril being in a line with the axis of the partially formed tube on the furnace.

The end of the mandril-rod is fixed to a wagon, capable of traveling on a draw bench. Underneath the bulb of the mandril is a pressing-roller, which is pressed upwards or against the bulb of the mandril by a spring or weight or otherwise. A pair of tongs, connected to the wagon of the draw bench or other drawing mechanism, take hold of the partially formed tube at its upper side, and motion being communicated to the said chain, draw bench or other drawing mechanism, the partially formed tube is drawn off from the furnace on to and over the bulb mandril, its overlapping and heated edges being pressed between the bulb of the mandril and the roller underneath and thereby welded together. After the welding of the skelp has been effected, the mandril and its rod, together with the tongs and welded tube, are removed to a sufficient distance from the furnace to allow the tube to be removed from the mandril. The mandril and other parts are then restored to their original positions near the furnace, ready to act upon the weld a second skelp. By means of this invention, welded iron tubes or pipes can be readily and quickly made, and from thinner iron than can be conveniently used in the ordinary method of manufacture.

Brass Alloys.

A very good brass, writes Edward Kirk in the *Iron Age*, is made of 16 pounds of copper, 8 pounds of zinc and 1½ pounds of lead. The lead should be added after the copper and zinc have been melted together. These proportions of the different metals make the best brass that can be made with zinc and copper. For very light castings the lead should be omitted, as it makes the alloy less fluid; but in heavy castings it makes them more solid and clean.

Button brass consists of 24 parts copper to 15 parts zinc.

Red brass is made of 9 parts copper and 1 part zinc.

Red brass made at Hegermuhl consists of 5½ parts copper and 1 part zinc.

Brass that bears soldering well consists of 16 parts copper and 6 parts zinc.

Brass for ship nails consists of 20 parts copper, 16 parts zinc and 2 parts iron.

Red sheet brass is made of 9 parts copper and 2 parts zinc.

Brass for sheathing, bolts, fastenings, etc., is composed of 6 parts copper and 4 parts zinc. The composition forms an alloy that may be rolled and worked at a red heat.

Brass for pumps, and machinery requiring great tenacity, is made of 32 pounds copper, 3 pounds tin and 1 pound zinc.

Brass for gear wheels, to have teeth cut in them, is made of 32 pounds copper, 3 pounds tin and 2 pounds old brass. If it is desirable to have the wheels harder, a little more tin may be added.

An alloy for turned and finished work is made of 32 pounds copper, 4 pounds tin and 3 pounds old brass. For nuts of coarse thread, one-half pound more tin may be added.

As more tin is added to alloys of copper and zinc, or copper and old brass, the alloy becomes harder. Razors have been made of an alloy of 32 parts copper, 5 parts tin and 5 parts zinc.

The best white hard metal for buttons is made of 16 parts copper, 2 parts zinc and 1 part tin.

NICKEL STEEL.—Struck by the low oxidability of nickel compared with the rapid oxidation of iron under the influence of water, M. Bousineault asked himself if in certain cases the first metal could not be substituted for the second, and he undertook to make some nickel steel. This is perfectly carburized by the ordinary processes of cementation, but the product has neither the elasticity nor strength of steel, and is not capable of being applied to any of the ordinary uses of steel.

The Past and Future of Invention.

When paper collars and cuffs were first invented they excited only general merriment, but emerging from the ordeal of a trial "to see what they were like," they became merchandise in which millions of dollars were invested and realized. White candles from bitumen; exquisite colors from petroleum; india-rubber pavements; ivory from chemically treated turnips; absorbent stucco work from potatoes and melon rinds; artificial sponges from prepared bread crumbs are no less curious than useful things, and they and the long line of endeavor they represent, indicate constant effort to alleviate the expense and annoyance of all the little as well as the heavier operations of life whose convenience was overlooked in earlier days.

And, as we look around, are we not amazed at the tardiness with which this line of invention has been taken up? It is true we now see a positively wonderful array of applications, but what are they compared with the wants to meet them? Our streets still roar and reek with the barbarous noise and filth of horse-power; our homes are made pestiferous with wretched drains and sewers; our eyes are destroyed by flickering and inadequate light after sundown; our systems are disorganized and infected by ill-prepared food. On all sides cleanliness, quiet digestion, shelter and locomotion are calling for still fresh devices to relieve us from thronging dangers and discomforts. Therefore let us have still more queer things in the way of invention, no matter how "outlandish" they may seem at the start, if they but discharge the office. All the grand hits that were made in the world were "queer things" to the haug-backs of mankind, and generally, the queerer they seemed when first announced, the greater the benefaction proved to struggling mortals.

STRAIGHTENING WARPED WOODS.—Of all the trials and vexations that beset the beginner, says the *Builder*, there are none more annoying than the tendency of wood to warp. He sends to his dealer for a small assortment of fine woods, and expects to receive them perfectly true and flat. Perhaps the woods are flat when they leave the dealer, but in transit they are very likely to twist out of shape, reaching their destination badly warped. The expressman may not be aware of the subtle nature of these woods, and in not a very gentle manner lays the package on a damp, cold floor. The dry wood sucks in the moisture on one side, swells and curls. It should not be a difficult matter to cure this. If the wood is a large piece the convex or hollow side should be steamed or moistened a little, and then laid upon a dry floor, holding it down with a smooth, flat board, upon which weights are placed. When quite dry it will be found to have regained its original shape. If the wood is in small pieces it can be easily straightened by gently steaming the convex side over a teakettle, and then holding the other side toward the heat until it becomes straight, when it can be left in a press or under weights for a few hours. Almost any warped woods will yield under this treatment.

FLOUR IMPROVEMENT.—It has long been known, says the London *Farmer*, that the keeping properties of flour may be very greatly improved by the simple expedient of driving off a portion of the water present in freshly-ground grain by means of heat. This fact was once for all firmly established by a series of experiments carried out under the direction of the eminent chemist, Payen, between 1860 and 1867, some of the samples of flour thus treated having been kept for upwards of 16 years without undergoing the least deterioration of quality. The greatest drawback to the general adoption of the system has hitherto been found in the want of suitable apparatus. This difficulty has now been overcome, M. Touillon having succeeded in perfecting a machine in which four metric centners of flour per hour can be effectually heated at a trifling expense. The grand prize of the "Société des Agriculteurs de France" has been awarded to M. Touillon for his invention.

IRON AND STEEL ROPES COMPARED.—The Superintendent of Cedar Point Iron Company, Port Henry, N. Y., says, in reference to the comparative merits of steel and iron wire ropes for hoisting purposes: "We have used iron and steel wire ropes extensively at our iron mines, and our experience in hoisting from 1,000 to 1,500 tons gross per day awards the superiority by all odds to steel. One steel rope lasts us, on an average, as long as six iron ones. We attempted to run them on same sheaves as we had used for iron ropes, and found, in some cases, that the steel rope would cut one inch into the cast-iron sheaves in one or two months of use. Our sheaves now are lined with wood, which entirely obviates every difficulty in the use of steel, and, of course, is equally to be commended for iron."

ANTI-FRICTION METAL.—English mechanics are talking about "metaline," a new bearing metal for running machinery, requiring no lubricant. The material was described as composed of metallic oxides, and other substances reduced to an impalpable powder, and pressed by enormous hydraulic force into steel molds. The resulting cylinders or plugs are to be inserted into holes made for their reception in ordinary brasses, and of which there should be about 10 to the square inch. The accounts we have seen are not very satisfactory, because they do not give the ingredients of which the new substance is composed.

SCIENTIFIC PROGRESS.

The Phonograph.

Hardly a month has passed since Prof. Edison's inventive brain first allowed the phonograph to see the light, and yet within this short space of time, according to a Philadelphia paper, he has evolved an improvement which tends still further to simplify the machine. In the improvement the cylinder is superseded by a circular piece of brass, which, starting at the center, runs round the plate several thousand times before the circumference is gained. The revolutions are also different, and the pointer which is attached to the diaphragm follows the thread by means of a movable arm. The plate is turned by clockwork, to secure a uniform rate of motion.

Mr. Edison is now turning his attention to improving the cultivation of the phonograph's voice, and proposes to effect his object by substituting for the funnel, which now brings out the sound, a tube similar in shape to the human mouth and supplied with teeth fixed similar to those in the human organization. The inventor calculates that he can produce a machine which will be able to talk thousands of words without cessation.

The phonograph will be one of the most conspicuous objects in the American section of the Paris exposition. It is proposed to have a large machine in constant operation in the machinery department. A large piece of tin foil will be electrolytically in such manner that the impressions made upon them will not be effaced by constant use. The machine will be so adjusted that an everlasting strain of talk in all languages can be kept up, and the tin foil packed anew for a repetition in centuries to come.

Prof. Edison has made application to the Patent Office for a patent on his invention, the "aerophone." In this machine the vibrating plate, which in the phonograph moves a sharp point over the revolving cylinder, operates as a valve to shut off and open a flow of steam through the pipe which leads from the boiler to a remarkably-constructed tube. By this contrivance the steam, instead of producing a discordant whistle, absolutely pronounces words with the utmost distinctness. The Professor, in his application, claims that the sound emitted from the machine can be heard for four miles.

How a Day is Gained and Lost.

Questions are frequently asked as to how a day is lost or gained in going round the world. Professor Davidson last evening gave a popular explanation of the phenomenon to the Academy of Sciences. He started a traveler westward from London, or rather from the meridian of Greenwich, precisely at noon, and he made him travel round the globe at precisely the rate of speed that the earth carries us eastward in its daily whirl of 24 hours. The traveler is always in local time at meridian; he goes round the globe in 24 hours, and it is always noon with him. At New York his application of time agrees with the clocks of the city, but his watch, which was at 12, noon, when he left London, is now 5 p. m. He goes still westward, and in longitude 120, the border meridian of Nevada and California, he is still at noon locally, and his watch indicates Greenwich time to be 8 p. m. In longitude 180, the sun is at meridian, and his watch shows that the time occupied by his journey is 12 hours; and in the longitude of the Ganges, 18 hours have elapsed; and continuing his transit to Greenwich he has still the sun in meridian, and finds that 24 hours have been lost. The rising and setting of the sun for one day has been witnessed by the people of London and not by the traveler. Actual time is the same, but in his case the division has not been marked. Going west, at 180 degrees of longitude, the navigator adds a day if it is Friday, Saturday is skipped and Sunday is proclaimed, to the consternation of the ship's parson, who is affrighted lest the prayers of the service may not have the same efficacy. Coming eastward a day is gained, and if it is Saturday when the meridian is reached, Sunday is made into another Saturday, and Monday becomes Sunday. Care is always taken to avoid the conjunction of two Sundays, as that would demoralize any crew.

Solidification of Gases.

We have described the success gained by two Frenchmen in reducing the so-called gases to liquid form and it now appears that they have so far pursued the elements that they become solids. M. Pictet, in a very recent experiment with hydrogen compressed at 650 atmospheres, found on opening the stop-cock that the gas issued with a noise like that of a hot iron bar under water, and it had a steel blue color. The jet suddenly became intermittent, and then there followed a sort of hail of the solid particles of hydrogen, which fell with violence on the ground and produced a crackling noise. Afterward the stop-cock was closed, and there was evidence that a crystallization of hydrogen took place within the tube; but when the temperature was again raised, the gas issued as a liquid. M. Dumas, the president of the French Academy of Sciences, accepts of these facts as full of confirmation of this theory, long ago advanced, that hydrogen is a gaseous metal. He now adds the statement that when a person

drinks a glass of water, he imbibes a metallic oxide. Nature, in mentioning these astonishing performances, couples with them another, which it regards as yet more remarkable from a scientific point of view. M. Pictet has been able to measure, with a very close approach to accuracy, the volume occupied by a given weight of oxygen in the liquid state; this was found to agree with the volume calculated for the solid or liquid gas, on theoretic considerations, by M. Dumas. By means of two Nicol prisms, M. Pictet observed the jet of liquid oxygen in polarized light, and found strong evidence of the presence of solid particles.

The Candle Tree.

Hoker's Journal of Botany contains an account of the "Candle Tree." Its growth is confined to the valley of Chagres, where it forms entire forests. In entering them, a person might almost fancy himself transported into a chandler's shop. From all the stems and lower branches hang long cylindrical fruits, of a yellow wax color, so much resembling a candle as to have given rise to the popular appellation. The fruit is generally from two to three, but not unfrequently four feet long, and an inch in diameter. The tree itself is about 24 feet high, with opposite trifoliate leaves and large white blossoms, which appear throughout the year, but are in great abundance during the rainy season. The *Palo de Velas* belongs to the natural order *Crescentaceae*, and is a *Parmentiera*, of which genus, hitherto, only one species, the *P. edulis*, De Cand., was known to exist. The fruit of the latter, called *Quahseilote*, is eaten by the Mexicans; while that of the former serves for food to numerous herds of cattle. Bullocks, especially, if fed with the fruit of this tree, guinea-grass, and *Batallita*, (*Ipomoea brachypoda*, Benth.), soon get fat. It is generally admitted, however, that the meat partakes in some degree of the peculiar, apple-like smell of the fruit; but this is by no means disagreeable, and easily prevented, if, for a few days previous to the killing of the animal, the food is changed. The tree produces its principal harvest during the dry season, when all the herbaceous vegetation is burned up; and on that account its cultivation in tropical countries is especially to be recommended; a few acres of it would effectually prevent that want of fodder which is always most severely felt after the periodical rains have ceased.

NEWSPAPER SCIENCE.—It appears that the New York *Herald*, in addition to the Livingstonian enterprise and its attending contributions to science, has achieved a success in meteorological observation and reporting, which is in advance of anything ever attained before. In a recent issue, the *Herald* gave a review of the first year's work of its weather service, with a complete list of the warnings and predictions transmitted by cable to Europe, with the manner of their fulfillment. The first warning issued was dated February 14th, 1877, predicting the arrival of a storm on the European coast five days later. The prediction was fulfilled to the letter. During the ensuing three months 11 more warnings were eabled and each was justified by the event. During May, June and July, 16 warnings were sent and but one proved out of time. From August, 1877, to January, 1878, out of 19 predictions eabled, 17 were completely fulfilled, one was generally fulfilled and one failed, the failure being due to a miscalculation of the progress of a slow cyclonic storm from the southwest. Thus, out of 46 warnings, only two wholly failed of complete or partial fulfillment. Of the 44 successes, 31 were correct in every particular, eight were correct in general and five were partly fulfilled by the arrival of storms on sections of the European coasts, but not affecting other sections to which their influence was believed likely to extend.

CALIFORNIA-MADE OBJECTIVES.—It will interest all microscopists to learn that at the last meeting of the San Francisco Microscopical Society, President Hyde produced a quarter-inch objective, manufactured in every particular, from lenses to brass work, in San Francisco. It was made by Mr. Frank Wilkins, who formerly worked for Ross in England, but now is with Mr. John Roach, of this city. Upon comparing the objective with a Smith & Beck's quarter, it was found to be fairly equal to it in every respect. The members found a new conformation, added to the many which California has furnished, that "Westward the course of Empire takes its way." To have founded and maintained a Microscopical Society on the very western edge of this continent, where the specimens for an evening's seance may have been collected during the day in primitive forests and where society is passionately bent on money making, must be a source of just satisfaction; but that the time has come when, in our own city, Mr. Wilkins can equip the members of this society with the most intricate product of optical manufacture, should certainly fill them with enviable pleasure.

TROPICAL FOREST IN SCOTLAND.—Those who know the stern climate of the rugged Scots, would hardly believe that the land was once of palms and tree ferns, and yet, at the recent meeting of the Physical Society of Scotland, Mr. David Grieve read a notice of a recent visit to the so-called tropical forest remains of Hampshire at Bournemouth, in which he stated that the remains of palms, feather ferns, and other tropical trees and shrubs were found there, showing that at some former time a tropical forest must have flourished.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Mar. 21	Week Ending Mar. 28	Week Ending Apr. 4	Week Ending Apr. 11
Alpha	10	7	8	7
Alta	5	4	4	5
Andes	60	45	50	35
Argenta	50	40	50	35
Baltimore Con.	10	1	1	1
Belcher	3	2	3	2
Belmont	90	80	100	110
Best & Belcher	13	13	17	17
Bullion	5	4	4	4
Bechtel	5	4	4	4
Bodie	90	80	100	110
Benton	50	50	15	10
California	21	13	2	2
California	21	26	27	30
Challenge	1	7	1	7
Chollar	28	24	28	27
Confidence	60	40	50	35
Con Imperial	60	40	50	35
Con Virginia	21	19	19	20
Crown Point	6	4	5	4
Dayton	15	10	15	10
DeFrees	10	10	10	10
DeFrees	11	15	15	15
Eureka Con.	41	36	43	40
Exchequer	3	3	3	3
Endowment	65	50	60	55
Grand Prize	7	6	6	6
Gila	60	60	55	70
Golden Chariot	6	7	7	7
Gould & Curry	8	7	7	7
Hale & Norcross	1	1	1	1
Hussey	1	1	1	1
Julia	2	1	2	2
Justice	7	6	7	7
Jackson	2	3	2	2
Joe Scatena	3	2	3	3
K & Con	3	2	3	3
Kentuck	3	2	3	3
Kossuth	10	10	10	10
Lady Wash	75	55	75	60
Leopard	75	55	75	60
Leviathan	75	55	75	60
Leeds	1	2	1	1
Modoc	1	2	1	1
Manhattan	10	11	10	11
Mexican	20	20	20	20
Meadow Valley	14	10	13	11
North Con Virginia	65	40	60	50
New York	1	6	1	6
Northern Belle	9	8	8	7
New Coso	50	50	50	50
Nevada	2	1	2	1
Occidental	43	25	43	34
Ophir	14	12	14	13
Overman	14	12	14	13
Panther	4	3	4	4
Raymond & Ely	4	3	4	4
Rock Island	10	7	9	8
Sage	20	20	20	20
Sierra Nevada	4	3	4	3
Silver Hill	2	1	2	1
Succor	1	1	1	1
Solid Silver	1	1	1	1
Star	1	1	1	1
Trojan	45	25	35	30
Union Con.	6	5	6	5
Utah	11	9	10	9
Wells Fargo	40	35	45	40
Woodville	40	35	45	40
Yellow Jacket	9	7	8	7

Sales at S. F. Stock Exchange.

Friday A. M. April 5.	450 Belmont	11		
145 Alta	5	740 Benton	1.70	21
100 Alpha	7	615 California	30	29
100 Andes	35	235 Con Virginia	20	19
300 Bullion	17	175 Chollar	27	26
165 Best & Belcher	17	100 Con Imperial	45	50
100 Belcher	2	1050 Dayton	15	15
630 Baltimore Con.	90	120 California	21	20
300 Benton	10	25 Confidence	4	4
540 California	21	500 Dayton	10	15
400 Con Virginia	19	140 Exchequer	22	20
150 Crown Point	6	500 Day	9	9
1600 Con Imperial	50	120 Exchequer	22	20
200 California	21	300 Eureka Con.	45	44
450 Dayton	15	400 El Dorado S.	7	7
140 Exchequer	22	150 Gould & Curry	6	6
20 Gould & Curry	6	210 Gould & Curry	6	6
745 Hale & Nor.	8	380 Grand Prize	6	6
330 Justice	7	200 Gila	7	7
580 Julia	3	150 Hale & Nor.	8	8
50 Lady Wash	3	100 Hussar	10	10
100 Leviathan	25	400 Hornet	10	10
100 Mexican	11	100 Hamburg	4	4
230 New York	20	200 Independent	9	9
1235 Ophir	14	350 Justice	7	7
265 Overman	13	3850 Julia	2.70	22
505 Savage	9	260 Leopard	45	40
300 Sierra Nevada	3	50 Leviathan	25	25
655 Silver Hill	1	130 Solid Silver	1	1
180 Solid Silver	1	240 Manhattan	11	10
1450 Succor	6	590 Modoc	1.85	20
1725 Trojan	45			

400 Alps	3
100 Argenta	35
650 Alta	5
2500 Belmont	1
550 Bechtel	4
555 Belle Isle	50
335 Bullion	3
20 Belcher	2
90 Bodie	1
280 Con Virginia	19
435 California	21
1070 DeFrees	10
325 Day	10
405 Burd Con	4
285 Grand Prize	6
900 Gila	75
115 Gould & Curry	8
1450 Hussey	1
350 Hamburg	3
300 Hale & Norcross	8
400 Independent	50
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MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

GETTING READY.—*Chronicle*, March 30: Superintendent Coleman, of the Double Standard, is pushing work at this company's mill, being anxious to start as soon as possible. We believe it is the intention to concentrate the ore and ship the sulphur to San Francisco.

AMADOR.

MILLS RUNNING.—*Ledger*, April 6: The Phoenix mill is running 60 stamps and working up good rock. The ten-stamp mill of the Montecarlo has been started up. New sulphuret works are being put up at Sutter creek by N. L. Gage.

THE LINCOLN MINE.—Owing to recent encouraging developments, the company contemplate adding 20 stamps more to their mill, making a total of 60 stamps.

ABOUT VOLCANO.—The Dane ten-stamp mill has been refitted with new machinery of the most approved pattern. Amalgamators and self-feeders have been put in. These improvements are expected to make a decided difference in the yield of gold. The last clean-up with this old machinery averaged \$20 per ton. There are several hundred tons of rock in sight in the mine which will reach that standard.

BUTTE.

GOOD PAY.—*Mercury*, April 5: The mining claim being worked by Chinamen at the foot of Hinton street, is paying \$6 a day to each hand. There are several thousand of these coolies now at work in the mines about Oroville, earning fair and, in many instances, large wages, all of them on ground that they have legally no right to occupy, and that an equal number of white men would be glad to mine if they were permitted to do so.

CALAVERAS.

CHAMPION.—*Chronicle*, April 6: They have begun milling the ores from this mine at West Point. Over a hundred tons is already out, and a large force of hands is employed in the mine. The shaft is over 400 feet in depth, a point at which the ledge is stronger and better than anywhere above. The pay chute is a long one, and to say that the rock is rich is to repeat what a hundred crushings have proved.

MILL STARTED.—The mill at the Hughes quartz mine, Chile Junction, was started Tuesday, everything running like clock-work. The company has 200 tons of ore on the dumps and is vigorously pushing operations at the mine. It is intended to keep the mill in constant operation in the future.

EL DORADO.

ITEMS.—*Mountain Democrat*, April 6: Hoisting works are being put up on the Keegan mine. Work advances on the Hallock quartz mine with good prospects. The Stuckalger still pays largely, nearly \$15,000 were taken out one day last week.

PROF. PRICE and Hamilton Smith, Jr., the latter Chief Engineer of the North Bloomfield mine and President of the Hydraulic Miners' Association, are expected in Placerville within a week or ten days, with a view to a general survey of the mining situation hereabouts, and especially, on the part of Prof. Price, with reference to an early commencement of operations on the Pacific ledge.

INYO.

REX MONTIS.—*Independent*, March 30: The mill has been stopped to undergo a thorough reconstruction.

EMIGRANT.—Work on the mines is suspended, with exception of sinking a 100-foot shaft, by contract. The mill is running on tailings with good success, preparatory to its being removed to a site better calculated for economical working. It will take 80 to 90 days to clean up the tailings. The Cactus and Valentine mines never looked better.

MODOC.—It is reported that important developments have been made in the Modoc company's mines. In our next issue we hope to be able to lay before our readers a detailed report embracing all the facts in the case.

LAKE.

CALIFORNIA QUICKSILVER MINE.—*Lower Lake Bulletin*, April 6: This mine, located near the boundary line, dividing Lake and Yolo counties, southeast of Lower Lake, has lately shown that it is rich in cinnabar deposits. One of the tunnels is over 1,300 feet in length, and the company, report enough ore in sight, in the drifts, to keep their furnaces going for five years. At present they employ only 60 or 70 men, but there will eventually be work for from 150 to 200 men. Everything is running very smoothly.

NEVADA.

EMPIRE.—*Grass Valley Union*, March 4: This mine made a shipment of \$16,000 yesterday. This is perhaps the oldest gold mine in California, as it has been worked for over 20 years, but its riches are far from exhausted.

A BIG CLEAN-UP.—The Pacific mining company, on New York hill, adjoining the Rocky Bar and the Grass Valley company's claims, have just had a clean-up of 15 loads of ore which yielded \$2,210, or \$147 per load. There is plenty more of the same kind of rock in the topes.

THE GOLD HILL.—Work on this mine will

be started up again in the spring, when it is intended to continue the sinking of the main shaft to open one or two levels.

SUMMER WATER.—At the big reservoir of the Eureka Lake canal company in this county, 25 feet of snow has fallen the past winter. This will give a supply of water for mining purposes which will last to a late period of the summer.

THE BLUE TENT.—*Foothill Tidings*: This is one of the largest hydraulic companies in the county, and their profits this season will be immense. They are running to their full capacity and using 3,000 inches of water.

PLACER.

MINING ITEMS.—*Herald*, April 6: On the quartz ledge struck a few weeks since on Rock creek an arastra has been put up, that is now running on the ore, which proves to be very rich. The Gold Run Hydraulic claim cleaned up \$5,337 last week as the result of 22 days' run, which cost them for labor and water \$1,900. A blast of 300 kegs of powder was fired in the Franklin mine last Tuesday, doing splendid execution.

PLUMAS.

GETTING LIVELY.—*National*, March 30: Braden, Neiswander & Co. are getting some encouraging prospects in their claims near Hungarian hill. The boys are in a rich section of country, and liable to take it out "big" when their water increases a little. The Plumas Ditch Company now have plenty of water, and are running the big ditch as full as they dare to. Mining matters throughout the county are everywhere getting lively.

SAN DIEGO.

JULIAN and BANNER DISTRICTS.—*News*, April 6: From the Huhard mine there have been extracted since its discovery in 1870, 400 tons of ore that has yielded an average of \$30 per ton. Five thousand dollars were lately cleaned up at one crushing. The Redman will soon commence taking out ore that will yield from \$50 to \$100 per ton. The Kentuck has from forty to fifty tons on the dump, and will commence crushing in a few days, with a probable average yield of \$65 to \$75 per ton. The Chariot mine is being worked night and day; are drifting and have commenced cross-cutting. The Hubbard, Ready Relief, Redman, Kentuck and Madden, all supposed to be on the same lode, will yield a goodly quantity of bullion in this near future.

TRINITY.

DEADWOOD.—*Journal* April 6: Mr. George Klein, of Deadwood, reports continued improvement in the prospects of that young district and predicts for it a bright future. Mr. Klein has two arastras, one of which he has lately been running on rock from the Phillips Bros., mine and which gave good returns. Twenty-eight tons of rock crushed last month yielded a little over \$1,000 and better is expected the next clean-up.

LABORERS SCARCE.—Miners desiring to employ men at this time have great difficulty in securing them. The fact is there are no men here who will work that are out of employment. Work is plenty, wages good and men scarce.

GOLD DUST is already beginning to flow into Weaverville and money is more plenty than a few months ago. We predict a continuous stream of the precious metals for the next four or five months.

MINERSVILLE.—Prospects here are good. Everyone in the neighborhood is busy and in consequence the town is dull, but lively times are certain to come after a while.

TUOLUMNE.

RICH.—*Union Democrat*, April 6: We saw several specimens of quartz from the Ferguson mine this week that were exceedingly rich, being studded through and through with coarse, free gold. If indications are anything, we should say this is a good one, and that the company has a very valuable mine.

Nevada.

CHERRY CREEK DISTRICT.

THE STAR.—*Independent*, April 6: Last Tuesday, this company opened up on the 360 level of their mine a body of ore, six feet thick and of high grade, but as they have made no explorations since, its extent is not known. Everything about the mine is working in a satisfactory manner. The stopes are turning out sufficient ore to run the company's 20-stamp mill, and, if necessary, produce seven times as much. The shaft is sunk to a point 45 feet below the 360 level, and going down at the rate of 45 feet per day. Eighteen thousand gallons of water per day are handled with.

DUN GLEN DISTRICT.

NEW LIFE IN THE CAMP.—*Silver State*, April 6: Col. Buel has put a force of men on the Lang Syne mine, and millwrights have been at work repairing and remodeling the mill, and, in eight or 10 days, pans will be in place and the mill ready to start. The prospects of the district look brighter than for several years. The men who have stuck to the camp have been obliged to ship their ore at great expense, which compelled them to assort them closely and ship only the richest, which left them, save in exceptional cases, only a small profit. The camp was consequently almost abandoned. Now a revival has taken place, and, with the prospects of a mill, miners are encouraged to go to work and take out ores from the many rich veins that have been discovered in that vicinity.

ELY DISTRICT.

OUR MINES.—*Pioche Record*, March 30: The Day ship 10 tons of ore daily, and appear to

have an extensive body of good ore. Raymond & Ely are taking out considerable ore from the upper levels, principally from the eighth and tenth—quantity and quality improving. They are also extracting ore from the old Burke mine. The 30-stamp mill is producing good results, and keeping the railroad pretty busy. In Alps the work continues as reported last week, pushing forward this development on the 12th level of the Mazeppa and prospecting in the Alps proper. The mill continues to run steadily on ore.

EUREKA DISTRICT.

ITEMS.—*Sentinel*, April 6: A body of ore, assaying \$140 per ton, has been struck in the Bald Eagle mine, 180 feet from the incline and 300 feet from the surface. Hoisting works and machinery will be placed on the Phoenix ground, and active operations commenced on the mine at once. The Williamsburg mine is yielding 10 tons of ore per day, the result of two men's labor. Over a quarter of a million dollars will be disbursed by the different companies during the present pay days, which amount ought to enliven business on the Base range. At the rate of production at the present time, the mining tax for this quarter will aggregate \$30,000. Ruby hill gives an out-put of 18,000 tons of ore per month, which, at a rough estimate, will yield \$1,000,000. As much as 2,000 tons of bullion are stacked up in the Richmond yard, in close proximity to the refinery. The Richmond bullion will average from \$290 to \$300 per ton; the K K Con., from \$260 to \$280; the Eureka Con., \$260. The numerous locations of claims in Eureka district, during the month, demonstrates the increased activity in mining circles. The amount of bullion shipped for the four months of 1878, ending to-day, nearly equals the entire product for 1877. The Richmond company shipped, this morning, 12 fine dore bars, valued at \$21,902.81. Twelve carloads of crude bullion and five of refined lead were shipped to Palisade yesterday. The value of the crude bullion shipped from Eureka daily runs from \$20,000 to \$25,000, aside from the lead.

LEWIS DISTRICT.

STARR & GROVE.—*Reese River Reveille*, April 6: This company is putting up a mill here to work its ore, and on its success the future of the district depends. The ore is rich, and ought to mill well, and the ledge from which it is extracted is large and well defined.

PARADISE DISTRICT.

NEW DISCOVERY.—*Silver State*, April 6: This newly discovered district is situated in the mountains at the head of Paradise valley, near the Red hill mines. The ore is undoubtedly rich. It contains native and horn silver, and is pronounced superior to any ever brought here from the northern part of the county. The ledge is four feet wide, and the samples brought here are from the croppings. It is encased in porphyry, and crops out boldly along the side of the mountain. The principal location here is named the Big Prize. Assays of ore from this claim show it to contain \$337.09 silver, and \$3.29 gold to the ton.

REVELLE DISTRICT.

Gila.—*Eureka Sentinel*, April 6: Favorable reports are again coming from the Gila mine. The latest official letter is as follows: "In the drift from the west crosscut eight feet was made during the past week. We have now drifted on the vein 18 feet at this point, and found it rich the entire distance. The average assay of the vein to-day is \$138.21 per ton. The raise from tunnel is now up 25 feet, the last five feet of which has been cut through the vein. We have to-day commenced drifting south. The stopes in south drift are turning out large quantities of ore."

Arizona.

MINES NEAR THE COLORADO.—*Sentinel*, April 6: Now that the new machinery is running smoothly, everything is going on satisfactorily at the McCracken and Signal mines and mills. The former will hereafter produce about \$90,000 and the latter about \$40,000 per month. The Castle Dome company is enlarging operations, and the Moss mine, up the river, is to be worked again.

PLACERS.—Louis Raggio and Maddox have struck good diggings near the Carga Muchacho, about four miles east of the railroad, out on the desert. They sunk 20 feet to bedrock, finding a good streak of pay dirt, on which they are now drifting. The gravel overhead is cemented together and stands well. We saw Raggio selling a hottle full of coarse, clean gold, elegant color, at the Italian stores. He says they are making very good wages.

NEW HOISTING WORKS.—*Citizen*, March 30: On the Hannibal mine steam hoisting works are about to be erected. The shaft is now down 90 feet and through the last 20 feet the water has come in so fast that it has required a double mule power to keep the shaft free. The vein is about four feet wide and will average from \$200 to \$300 per ton. The ore can be worked easily with concentrators.

MINES NEAR FORT YUMA.—Eleven tons of quartz from the Buena Vista mine, about 20 miles above here, up the river, were shipped to San Francisco by laeger to be worked. They gave results varying from \$16 to \$27 free gold, and encouraged several parties to negotiate with him. The mine is only one and one-third miles from steamboat landing on the Colorado, road good, wood cheap, ore plenty. Professor Thomas Price examined the ore and pronounced it easy to work. Huhn & Luckhardt have advised crushing the quartz between rollers, dry,

and then grinding the coarse pulp in arastras or pans. Much of the gold is fine and likely to be lost by battery process.

Colorado.

MINING NOTES.—*Sunshine Courier*, April 6: Blossom quartz yielding \$1,000 to the ton has been discovered at Table Rock, near Russell gulch, where gold was first discovered in Colorado. Machinery of sufficient power to sink to the depth of 1,000 feet is being placed on the Kent County mine which, until recently has kept 37 stamps running most of the time. The Black Hawk is yielding so much ore that the owners are hastening forward the new works at Denver as fast as possible.

LEADVILLE.—A rich strike of mineral has just been made on the Robert Burn claim at the head of Stray Horse gulch—in the ore ten feet, and it promises to be rich. In the Morning Star claim 400-ounce sand been developed. Many people at Leadville are out of work and business seems to be overdone. There are, however, a number of good mines here and prospects of finding many more. About all the land is taken up for three miles square. The mines are nearly all worked with pick and shovel, as there is very little rock to blast, some over 100 feet deep that have not had a blast in them. Business lots on Main street are selling at from \$1,000 to \$1,500, on the back streets lots are worth \$25 and upward.

COAL.—The Denver and Rio Grande railway company are at present raising about 60 tons of coal per day at their mine above Trinidad. Forty tons of it are converted into coke on the ground, while the remainder goes to Prof. Hill at Black Hawk, and to the Denver gas works. Five hundred tons of coke were sold to a Salt Lake party a few days since.

Dakota.

BLACK HILLS.

PLACERS.—*Times*, April 2: Preparations are being made to work the placer claims in Potatoe gulch the coming season. It is the opinion of the miners there that the dirt will pan out as high as it ever did in Deadwood gulch. Prospecting for quartz is being carried forward with considerable energy, and with good indications of success.

BONDED.—It is reported that a lead called the Virginia, at the head of Gold run, had been bonded to California parties for \$40,000. Cunningham & Dorrington's mill is at work on ore from the Great Eastern Consolidated, which promises to run \$18 to \$20 to the ton.

At Rapid City and vicinity a good many substantial dwellings and business houses are in course of erection in various portions of Rapid, and it has at length been discovered that skeleton frames are not the best inducements to flaunt in the face of newcomers in order to induce them to tarry and swell the flood. The mines up Rapid creek in the Ruhy district, in the Cinnehar, Deadman's gulch, and other districts, are being developed rapidly and fully as means will permit. The boys at Rockerville are busy rocking out gold, which is of excellent quality, and quite large amounts secured. The lack of mills, and at Rockerville, of water, is a very serious drawback. However, all these obstacles will doubtless be removed at an early day.

EVERY BODY COMING.—An immense immigration from the East is expected into the Hills the coming summer. Three stages arrive at Deadwood daily, one from Cheyenne, Sidney and Bismarck each, but they are insufficient to accommodate the travel, though one stage a year ago was more than sufficient.

Idaho.

BOISE BASIN.—*World*, April 2: Lauer & Co. have commenced pining in their claim on Gold hill. Riordan, Barker & Co. have started up their claims on the south side of More creek. The snow has all disappeared from the foothills. The shaft in the Gambrian is down 80 feet, and a drift is being run to tap the pay chute. This mine paid handsomely in early days, but the company who owned it lost the ledge, and work was abandoned. Messrs. Lick & Slocum have been sluicing over two weeks in their claims at the head of Slaughter House gulch. The ground is very rich, but three or four weeks is as long as they can run in a season, owing to the failure of water. All the mines of Alturas county are turning out well.

PLACERVILLE.—The snow is disappearing very fast, and most all of the placer mines have been set in operation. The Granite Creek ditch company succeeded in getting water through their ditch last Tuesday, and all claims to be supplied by it will commence operations immediately. Danskin & Co., on Canyon creek, will commence mining next Tuesday, and the Fall Creek company will start on Monday. This is rather early for those claims, as they are on a very high mountain. As spring has opened rather early, with a good supply of snow on the mountains, the mining season will be an unusually long one.

Oregon.

ABOUT JACKSONVILLE.—*Sentinel*, April 3: The Centennial mine, after a seven days' run, made a clean-up of \$230. This, considering their limited supply of water, is good. Chinaman Lin is now making over \$100 per day in his mines on Applegate. A clean-up was made at Capt. Ankeny's mines, on Galice creek, last week, after a six weeks' run, and upwards of \$10,000 worth of gold was taken out. A lump of pure gold worth \$212 was picked up by Mr. Mayhurn last week in his mines on Foot's creek. Work on the Enterprise ledge, Althons creek, Josephine county, has been suspended.

Jumping Seeds or Devil Beans.

These curious little things which we have heretofore described and illustrated in the PRESS, have excited no little interest among entomologists, and their studies have brought to light many interesting facts concerning the written history of the insect, the determination of its proper name, and that of the plant it infests, and other points of local interest on this coast. We take therefore from the transactions of the St. Louis Academy of Science, which are kindly furnished us by Mr. Harry Edwards, the following interesting paragraphs:

Mr. Riley exhibited certain seeds which possessed a hidden power of jumping and moving about on the table. He stated that he had recently received them from Mr. G. W. Barnes, of San Diego, Cal., and that they were generally known by the name of "Mexican jumping seeds." They are probably derived from a triococcus euphorbiaceous plant. Each of the seeds measures about one-third of an inch, and have two flat sides, meeting at an obtuse angle, and a third broader, convex side, with a medial carina. If cut open, each is found to contain a single fat, whitish worm, which has eaten all the contents of the seed and lined the shell with a delicate carpet of silk. The worm very closely resembles the common apple worm (*Carpocapsa pomonella*), and, indeed, is very closely related, the insect being known to science as *Carpocapsa salitans*. It was first recorded by Westwood in the proceedings of the Ashmolean Society of Oxford, in 1857 (t. 3, pp. 137-8), and repeatedly referred to under the name of *Carpocapsa Dehaisiana* in the Annales of the French Entomological Society for 1859. The egg of the moth is doubtless laid on the young pod which contains the three angular seeds, and the worm gnaws into the succulent seed, which, in after growth, closes up the minute hole of entrance, just as in the case of the common pea weevil (*Bruchus pisi*). Toward the month of February the larva eats a circular hole through the hard shell of its habitation, and then closes it again with a little plug of silk, so admirably adjusted that the future moth, which will have no jaws to cut with, may escape from its prison. A slight cocoon is then spun within the seed, with a passage way leading to the circular door; and the hitherto restless larva assumes the quiescent pupa state. Shortly afterwards the pupa works to the door, pushes it open, and the little moth escapes. When ripe, the shell is very light, and, as the worm occupies but about one-sixth the enclosed space, the slightest motion will cause the seed to rock from one of the flat sides to the other. But the seed is often made to jerk and jump, and, though this has been denied by many authors, Mr. Riley has had abundant proof of the fact, and had seen the seed jerked several lines forward at a bound, and raised a line or more from the surface on which it rested. If the seed he cut, the worm will soon cover up the whole with a transparent membrane of silk; and if two of the opposite angles be cut, the movements of the worm can then be seen, if the seed he held against the light. It then becomes evident that the jerking motion is conveyed by the worm holding fast to the silken lining by its anal and four hind abdominal prolegs, which have very strong hooks, and then drawing back the head and forebody and tapping the wall of its cell with the head, sometimes thrown from side to side, but more often brought directly down as in the motion of a woodpecker's head when tapping for insects. In drawing back the forebody, the thoracic part swells, and the horny thoracic legs are withdrawn, so as to assist the jaws in receiving the shock of the tap, which is very vigorous and often given at the rate of two per second and for 20 or more times without interruption. It is remarkable that this, of all the numerous seed-inhabiting *Lepidopterous* larvæ, should possess so curious a habit. The seed will move for several months, because, as with most, *Tortricoides* larvæ, this one remains a long time in the larva state after coming to its growth and before pupating.

Mr. Barnes gives the following account of the plant, received through Capt. Polhamus, of Yuma, A. T. It seems to be called both *Yerba de flecha* and *Colliguaja* by the Mexicans:

"Arrow-weed (*Yerba de flecha*).—This is the name the shrub bears that produces the triangular seeds that during six or eight months have a continual jumping movement. The shrub is small, from four to six feet in height, branching, and in the months of June and July yields the seeds, a pod containing from three to five seeds. These seeds have each a little worm inside. The leaf of the plant is very similar to that of the *Garambullo*, the only difference being in the size, this being a little larger. It is half an inch in length and a quarter of an inch in width, a little more or less. The bark of the shrub is ash-colored, and the leaf is perfectly green during all the seasons. By merely stirring coffee, or any drink, with a small branch of it, it acts as an active cathartic. Taken in large doses it is an active poison, speedily causing death unless counteracted by an antidote."

DREDGING A RUSSIAN RIVER.—The Russian government is reported to have concluded a contract with an American dredging company for the deepening to a uniform depth of 28 feet the channel of the river Neva, between Cronstadt and St. Petersburg. The quantity of mud, etc., to be excavated is estimated at 15,000,000 cubic yards, and the work must be completed in four years.

Mines and Minerals of British Columbia.

Geo. M. Dawson, formerly a resident of this coast, where he was well and favorably known in connection with mining matters, has a well written paper on the mines and minerals of economic value in British Columbia in the Canadian Pacific railway report. The discovery and partial development of vein mines in that region imparts to this paper an additional interest. The interior plateau of British Columbia, says Mr. Dawson, represents the great basin of Utah and Nevada, but north of the southern sources of the Columbia, this region is not self-contained as to its drainage, but discharges its waters into the Pacific. In British Columbia, a belt of rocks, probably corresponding more or less completely with the gold rocks of California, has already been proved to be richly auriferous, and it is believed that the discovery and working of rich metalliferous deposits of other kinds will follow. Promising indications of many are already known. In British Columbia, so far as geological explorations have yet gone, they have tended to show a general resemblance to the rocks of the typical sections of California.

It may be said without exaggeration that there is scarcely a stream of any importance in the province of British Columbia in which the color of gold cannot be found. The discovery of gold, first made known in 1858, led to a great influx of miners. Gold, thus the first cause attracting attention to the country, has ever since been the chief factor in its prosperity. The average number of miners employed yearly has been 3,220, and the average earnings per man per year, \$658; and from the discovery of the metal to the end of 1876, the total yield of gold was about \$38,166,970, or about \$40,000,000 to the present time. As in all new gold mining districts, the shallower placer deposits and gravels first attracted attention, but with the experience of California and Australia, it was not long before the deep digging were found to be by far the most profitable. In many cases the machinery and appointment of the mines are very creditable, and almost the whole expense of the mining enterprise is borne by the miners of the districts themselves, without the aid of foreign capital and with labor and materials of all kinds at exorbitant rates. Money earned in one venture is embarked in another, and some of the shareholders of a mine are frequently at work themselves below ground. Ordinary laborers receive \$5 per day, mechanics from \$5 to \$7, and Chinamen and Indians, \$3. These prices, though a great reduction on those ruling before the construction of the wagon road, preclude the working of any but the richest deposits, which necessarily bear but a small proportion to those with a moderate or small amount of gold, and, in working over the deep ground in early days, much was left which would even now pay handsomely, but cannot be found or reached on account of the treacherous nature of the moved ground, filled with old timbering and water.

In most gold-bearing countries, the placer mines, though often rich, have eventually led to the mining treatment of the auriferous quartz from which the alluvial gold has been derived. In British Columbia, the alluvial deposits have so far absorbed the mining energy of the country, but in view of the already diminished yield of the best known placers and the inevitable more or less complete exhaustion of deposits of this kind within at best a moderate term of years, attention cannot too soon or too carefully be turned to the more permanent quartz mining. Vein mining, once initiated, will, Mr. Dawson believes, rapidly develop, giving to the district a permanent character, which it does not now possess, and indirectly tending to cheapen labor by affording employment in summer and winter. The gold occurs as usual in association with iron pyrites, but also often with considerable quantities of galena, through crystalline masses of which the precious metal is sometimes strung.

THE CHINESE IN CANADA.—The Canadians do not seem more fondly disposed toward the Chinamen than Californians. In fact, without half the cause to complain, they complain much more loudly. A member of the Canadian Parliament has moved to instruct the Government to insert a clause in all contracts for the construction of the Canada Pacific railway, that no man wearing his hair more than five inches and one-half in length shall be eligible for employment on that road. The proposition was explained as being intended to meet a great national question—the immigration of the Chinese—and as being the most direct means of reaching it. The immigration of the Chinese, the speaker regarded as tending to retard the settlement and progress of British Columbia. The proposition was voted down; as a similar proposition would be voted down in the American Congress, but its introduction shows that the few Chinese who have penetrated into British Columbia are regarded as a menace to its prosperity. In California they constitute about one-seventh of the population, their adult males being in number equal to three-fourths of the voters. When Canada or the Eastern States finds their population Mongolianized to this extent, they will not vote down anti-Chinese propositions of any kind.

EMPLOYMENT OF DYNAMITE.—The accounts of the English Arctic Expedition under Capt. Nares, show the application of many devices supplied by the advancement of science for overcoming the obstacles presented by nature to guard the approach to the pole.

The Use of the Precious Metals in the Currencies of the World.

At this time, when so much is being said about the relative value and uses of gold and silver in the currencies of the world, it may interest the public to know the countries, with their populations, in which silver alone is recognized as the standard, those in which both gold and silver are employed and those in which gold alone is in use. The exclusively silver-using nations are:

	Population.
Russia.....	87,000,000
Austria.....	36,000,000
Central America.....	2,000,000
Ecuador.....	1,300,000
China.....	425,000,000
India.....	360,000,000
Mexico.....	9,000,000
Peru.....	4,500,000
U. S. Columbia.....	2,700,000
Tripoli.....	1,200,000
Tunis.....	2,000,000
Holland.....	3,700,000
Venezuela.....	1,400,000
Total.....	876,700,000

The hi-metallic nations, that is those using both gold and silver as a standard, are:

Belgium.....	5,100,000
Bolivia.....	1,300,000
France.....	30,100,000
Greece.....	1,500,000
Italy.....	26,800,000
Spain.....	10,500,000
Switzerland.....	2,700,000

If to this we add the United States, 45,000,000, we have 1,012,200,000 people, who use either silver or silver and gold standards, while Great Britain and her provinces, Egypt, Portugal, Turkey, Persia, Brazil, Argentine Republic, Germany, Sweden, Denmark, Norway, Chile and Japan, with 180,000,000, use a gold standard only.

The Iron Horse of the Desert.

F. J. McWorthy, one of the principal owners of the San Francisco Sulphur mine, at Rabbit Hole, was in town yesterday and gave us the following information relative to the steam wagon brought to Mill City for the purpose of hauling sulphur from the mine to the railroad. The wagon was invented and built by Doane Brothers, of Sacramento, and tested at several fairs in California. It weighs, without fuel or water, seven tons. It has three driving wheels, each six feet high, and tires 10 inches wide to prevent it from sinking in sand or soft ground. Attached to the face of the tire are flanges, shaped like a segment of a circle, to prevent it from slipping when loaded. The axle of the front wheel turns on a pivot shaped like a hall, and is operated by a lever, by which the machine is guided, and by which it can be readily turned in any direction. It has the same pulling capacity on a curve that it has on a straight road, and can be turned as readily as a mule team. It is expected to haul 20 tons of sulphur from the mine to Mill City at a load, and make the round trip—about 60 miles—in two days, with two cords of ordinary wood. Its speed can be regulated according to circumstances, but when attached to heavily loaded wagons it is not desirable to run it faster than three miles an hour. A contract has been entered into by the Sulphur company and the Doane Brothers, according to the terms of which the latter are to deliver refined sulphur from the mine at Mill City for six months at five dollars per ton. To-day it left for the mine with two wagon loads of machinery for the refining works, and its return with a load of sulphur is looked for with considerable anxiety. Should it do all that is claimed for it, and travel over ordinary roads with two or three wagons loaded with 40,000 pounds, it will be of incalculable benefit to Nevada.—*Nevada Silver State*.

INLAND SEA IN ALGERIA.—MM. Dumas and Dauhree have urged several objections to the proposed artificial inland sea in Algeria, and agree with M. Naudin, who read a paper on the subject at a recent meeting of the Academy of Sciences, that its sanitary effects would be deplorable. It is thought that to fill the shallow basins of the region which it is proposed to convert into a sea with salt water would be equivalent to reproducing in Algeria all the worst features of marshy plains. Captain Roudaire, who proposed the scheme, admits that even in the center there would nowhere be more than about 80 feet of water, and the whole coast line would have so little water that it would be little better than a sand-bank with an admixture of salt and fresh water, upon which the strong tropical heat would act in the most deleterious manner for two-thirds of the year, causing a rapid decomposition of organic matter, and spreading contagion for miles in every direction. M. Naudin considers that there is no similarity between this district and Egypt, the climate of which country has been much improved by the creation of the Suez Canal and the plantation of trees; for, according to him, while Egypt lies between two seas, and is traversed by an immense river which has periodical overflows, the Algerian district is far from the sea, and is bounded by arid deserts.—*The Engineer*.

GOING FOR THE FOSSIL FUEL.—The coal production of the world has increased enormously since 1845. In that year, Great Britain produced 31,500,000 tons; in 1874, 125,043,000; Belgium, 1845, 4,960,077; 1874, 14,669,000; France, 1845, 4,141,617; 1874, 16,949,000; Prussia, 1845, 3,500,000; 1874, 41,754,600. In the United States the production in 1874 was nearly 10 times that in 1845.

Chinese Money.

The following on the Chinese monetary system is from the *Popular Science Monthly*: The Chinese probably illustrate in the most extreme manner the length to which loose views concerning currency can be carried. The history of their currency presents that mingling of the grotesque with the tragic, which most of their actions have when viewed through western eyes. Coined money was known among them as early as the eleventh century before Christ, but their inability to comprehend the principles upon which a currency should be based has led them into all sorts of extravagances, which have been attended by disorder, famine and bloodshed. Coins came at last to be made so thin that 1,000 of them piled together were only three inches high; then gold and silver were abandoned, and copper tin, shells, skins, stones and paper were given a fixed value and used until, by abuse, all the advantages to be derived from the use of money were lost and there was nothing left for the people to do but to go back to barter, and this they did do more than once. They cannot be said now to have a coinage; 2,000 years ago they made round coins with a square hole in the middle, and they have made no advance beyond that since. The well-known cash is a cast-brass coin of that description, and, although it is valued at a mill and a half of our money, and has to be strung in lots of 1,000 to be computed with any ease. It is the sole measure of value and legal tender of the country. Spanish, Mexican and our new trade dollars are employed in China; they pass because they are necessary for larger operations, and because faith in their standard value has become established; but they are current simply as stamped ingots, with their weight and fineness indicated.

Western Nye County.

Mr. George W. Emerson, who has been visiting the western part of Nye county, Nevada, gives the following items to the *Belmont Courier*: At Grantsville, a mining camp located 11 miles south of Ione and 15 miles southeast of Ellsworth, there is renewed activity in the grading of lots, building of houses, etc., and from present indications 60 days hence will show a largely increased population.

The Alexandra mining company, M. San Pedro, Superintendent, is working 30 odd men in the mine. Five large teams are employed hauling ore to the Ellsworth mill and to Ural company's mill near Ione. Both mills are running steadily. Bullion shipments are made regularly by fast freight to Wadsworth every ten days. The present depth attained in working this mine is about 160 feet from the surface, at this depth there is a good deal of high grade ore, assays showing nearly \$300 per ton. In cutting the vein at this depth 18 feet has been reached and no sign of the hanging-wall. At the various openings large quantities of ore can be seen, and if there were mills of sufficient capacity in close proximity to the mine the company could as well employ 200 men as their present force.

A new location belonging to Mr. A. B. Harvey and another party shows fine ore that assays \$263 per ton.

It is expected that a 20-stamp mill will be in process of erection next month.

At Ellsworth, A. J. Hawk has several of his mines leased, and some high grade ore is being extracted.

At Lodi a large amount of high grade ore is waiting the completion of Raymond's new furnace, and when it is once in good running order there will be need of teams for the shipment of bullion.

At Carbonate Point the openings show an improved condition of the mine, with high grade ore. Judge Downey contemplates the building of a furnace very soon for the reduction of their ores.

POPULATION IN IDAHO.—Idaho cannot boast of a large population, but her unbounded resources and capabilities of affording homes for the thousands who will surely come, none can gainsay. A very large percentage of the population of Idaho—the portion most contented, most prosperous, and most permanently identified with the country, has come to her from the West—from Oregon and Washington, whither they had been induced to go by the organized efforts and representations of immigration agents. From this source there is still, and will continue to be a constant and regular gain of population, and when the people of Idaho awake from their lethargy, and learn to imitate in some degree the energy and persistence of their neighbors in showing the resources of the Territory, in inviting immigration, a fair share of the current will be attracted to our fertile and unoccupied valleys.—*Statesman*.

COLOSSAL BALLOON AT THE PARIS EXHIBITION. Among the objects of interest at the Paris exhibition of 1878, will be a monster captive balloon. It will be 16 feet higher than the Arc de Triomphe. It will be strong enough to carry an engine and its driver; it will hold 50 persons at one time, and raise them to an elevation of more than 1,600 feet. It will be made of alternate layers of silk and India-rubber, which will be joined together by more than three and one-half miles of cotton. The balloon will be held captive by cables capable of resisting a strain of 10,000 kilograms.—*Manufacturer and Builder*.

Mines at Silver City.

The mining situation in this vicinity remains about the same as at the date of last report. There is a steady improvement in the quality of the rock being taken out at the Potosi, and the mine has a most promising outlook. The Black Jack continues to prospect better than ever and the great lode of the country is believed to be on Florida mountain. St. Clair & Newcomb have struck it immensely rich in their mine. They have about 50 tons of choice rock ready for crushing. The mine worked by Simondi & Martin, near the Poorman, is looming up in immense proportions. At least 50 men ought to be at work there.

Considerable disappointment has been experienced here at the shutting down of the Golden Chariot works, which it is hoped, however, may prove but temporary. Some of the oldest and most experienced miners in this vicinity express the belief that the company have committed an error in judgment in not prospecting the lower levels to a greater extent, whereas, according to their statement, there are the most promising indications of a large and permanent ore body. The descent from the 13th to the 15th level revealed a decided improvement in the indications and there cannot be any doubt of the existence of a mammoth lode in the immediate vicinity or at a not very great depth below the point now reached. We regret that this company did not for their own sake, as well as for that of the country, cause further operations to be made in the lower levels and follow up the work there commenced by them under quite favorable auspices. They may have thus lost their golden opportunity, and, if it should so turn out, it is to be regretted, as the company deserve to meet with ample reward for the zeal, energy and perseverance they have displayed in their work on War Eagle mountain. The diamond drill, which is now on the ground, will be operated, we understand, from the surface, and while there is a prospect of striking a rich ore body in the vicinity that will prove remunerative, we have doubts as to whether the developments can prove as promising as they certainly did fair to in the lower levels.—*Idaho Avalanche*.

TREASURE MOVEMENTS.—During the month of March, Eureka district shipped abroad crude bullion valued at \$439,750. In the same period the Richmond company shipped fine ore bars, valued at \$173,789.44, making our total treasure shipments for the month, \$613,539.44. This sum does not represent the total yield of the district, as the Richmond furnaces turn out crude bullion much faster than the refinery is able to separate it, and there is now stocked up at the works nearly 3,000 tons of bullion, awaiting that process. The gross yield is something over \$800,000, the output of eight furnaces. The shipments of refined lead and the lead contained in the crude bullion will aggregate 3,000 tons, which estimated at its present value, \$75 per ton, would add \$225,000 to the above, and make a grand total of something over \$1,000,000, which latter amount may be set down as our regular monthly contribution to the wealth of the world. There was also received and forwarded during the month, through Wells, Fargo & Co., bullion to the amount of \$173,346.92, the same being a portion of the product of the several districts south of this point.—*Eureka (Nev.) Sentinel*.

RAILROAD LAND DECISION.—It is said that the Secretary of the Interior is likely to soon make a decision that will be of vast importance to western land-grant roads. This new departure is based upon the decision of the United States Supreme Court in the Osage land case. The court held that the railroad was not entitled to land indemnity in the place of lands disposed of by the United States prior to the grant. This decision changes the previous practice in the Land Office, and greatly reduces the grants to many roads. The Land Office is now readjusting the grants to conform to this decision. Four western roads have been readjusted. The Wisconsin Central has already received 41,800 acres more than it is entitled to, and its grant is reduced from 757,000 acres to 587,000. The Hastings and Dakota road, in Minnesota, is reduced from 1,251,141 acres to 745,538. The readjustment will proceed until all reductions are made.

NEAR ITS DESTINATION.—The last shipment of machinery for the Homestake mining company's mill at Lead City is now on the road between here and Rapid. An idea of the size of the mill may be had, when we state that the hoiler weighs 7,500 pounds, the crushers, 8,200 each, the cylinder, 5,500, and the fly wheel, 13,000, weighing altogether 500,000 pounds. A derrick of 38,000 weight will soon be shipped by Cuthers & Young to be used in putting the machinery in place, and it is thought the mill will be in running order by the 15th of May.—*Black Hills Times*.

THE INAHU MINE.—The Idaho mining company at Grass Valley paid its monthly dividend of \$7.50 per share on Monday, aggregating \$23,250. This makes the 104th dividend paid by the company, and from all appearances the mine will continue to pay them for years to come. There is plenty of pay ore in the stopes from the 7th to the 10th or bottom level, and on the latter the ore in the drift looks very fine. The Idaho is a magnificent mining property, as its dividends of upwards of \$2,300,000 testifies, says the *Union*.

USEFUL INFORMATION.

VARIOUS KINDS OF FILTERS.—In a recent lecture on water purification, Mr. J. W. Pearce said that the first record of a water filter was in 1790, when Johanna Hempel employed porous vessels; and in the following year the ascending principle was first mentioned. Vegetable charcoal as a filtering medium was first named in 1802, animal charcoal in 1818, and solid blocks in 1834. Turning to the modern practice of filtration, the author observed that Atkin's system embodied the last-named principle, finely divided charcoal being agglomerated into porous blocks. The advantage of employing carbon in that form was that the impurities were arrested on the surface, and were easily removed. Major Crease compressed loose animal charcoal in a granular state, between plates, by means of a screw, the amount of compression being determined by the degree of impurity in the water to be filtered. Major Crease's system is adopted in the Army and Royal Navy. The chief characteristic of Mr. F. H. Danochell's filter was that the ascending principle was used, so that impurities, instead of lodging on the top, fell back on the bottom of the tank. The Sanitary Engineering and Ventilating Company use mineral carbon as a filtering medium, and cause their cistern filter to be cleansed by the influx of this supply, and also by reversing the flow. In the silicated carbon filter, mineral charcoal is used as the filtering medium, the main supply filter having three slabs with layers of coarse and fine granular carbon between. In Prof. Bischoff's spongy iron filter, the iron exerts a powerful influence on the water, impregnating it with iron, which is afterwards oxidized and arrested, leaving the water pure. M. Le Tellier's hydro-metric purifier was described as removing the hardness from water by throwing down the lime, which was afterwards intercepted by filtration through charcoal.

SUBSTITUTES FOR BOXWOOD.—It appears, says the *British Trade Journal*, that in consequence of the continued cost of boxwood and its rapid decrease in quality, one of the principal importers of this and other hardwoods into England has succeeded in introducing two American woods to be used instead of box in the manufacture of shuttles, a purpose for which immense quantities of boxwood have hitherto been used. The woods so substituted are those of the cornel and persimmon. The first is apparently the *Cornus Florida*, a deciduous tree, about 30 feet high, growing abundantly in woods in various parts of North America. The wood, though of small size, is hard, heavy, and close-grained, and is used chiefly in America for the handles of tools and for shuttle-making, and, when properly seasoned, is much superior to Persian boxwood. The same may be said of the persimmon (*Diospyros Virginiana*), a tree belonging to the ebony family, a native of the United States, where it grows to a height of from 50 feet to 60 feet, and a diameter of a foot or 18 inches. The heart-wood is of a dark brown color and very hard. The trunk is covered with a very thick, hard, and rugged bark. One great point to be particularly remembered in the preparation of these woods for shuttle-making is the very gradual drying by artificial means; this is the more particularly recommended in the case of the cornel, undue haste in seasoning, it is said, having in some cases created a prejudice against the wood. As an illustration to some extent of the effects of the war, it may be stated that whilst in 1876 over 10,000 tons of boxwood were imported into England, the year just passed shows a return of only between 4,000 and 5,000 tons.

COAL IN GRATES.—The use of hard or anthracite coal in stoves or ranges, for domestic purposes, is, says *Scribner's Monthly*, essentially wasteful and expensive, because the full heating value is not utilized. An ordinary grate gives only three per cent. of the heating capacity of the coal consumed in it. Coal as a fuel is not sufficiently under control to be economized. The cost of coal is next to rent, the largest expense in domestic life. It is a conventional form of expression to say that coals burn. Practically it does not burn—it merely supplies gas, and the gas alone gives the flame, light, and heat. In starting a coal fire, paper or other light material is burned (or its gas), and this heat compels the kindling-wood to give up its gas, that escapes in singing jets, and this burning gas forces the coal to give up its gas in turn, and this burning coal gas makes our fire. The process of breaking the gas out of the coal proceeds through each lump from the outside toward the interior, and the stony and useless matter that forms the bulk of the coal, and that makes the ashes resist the process, and absorbs and wastes the heat of the burning gas. Besides this the gas is accompanied by other non-burning gases, and these rob the flame of its heat, check the combustion, and carry away unburned, up the chimney, much of the valuable gas.

RESIN IN SHELLAC.—The *Polytechnic* translates from foreign authority as follows: For the detection of resin in shellac take five grains of shellac finely powdered and boil with 15 grains of petroleum benzene. The dissolved portion is evaporated and weighed. If the residue be greater than 10% of the shellac, such excess is due to the presence of resin. Another method is to take 25 grains of shellac and boil the same with 25 grains of caustic potash and

50 c. c. of water until all is dissolved. If the shellac is pure, the solution is of a red color and transparent when held to the lamp-light, and contains muddy portions in the upper strata, which are easily separated on agitation. The shellac adulterated by means of resin forms a thick deposit, not easily broken up by shaking. This precipitate can be washed with water, and hoiled in 2.5% hydrochloric acid; this, when dried, melted and weighed gives, when multiplied by 1.25, approximately the quantity of resin contained.

KILLING FIELD MICE.—A writer for the *Rural World* says: Years ago we laid out this mice pretty cleanly by the following contrivance: Take blocks about the size of a brick of some wood that can be easily bored; bore with an inch auger about six inches into the middle of one end. Take corn meal one quart, and mix in it four ounces of arsenic; fill the holes in the blocks to within an inch of the muzzle, ramming it down pretty tight. Lay these in the field where mice do congregate, with the open end lowest to keep wet out, and my word for it, there will soon get shot without hearing any noise. These silent guns should be looked after frequently; and when empty be reloaded, and whenever you have to reload you can rest assured that there are dead mice about. I would recommend strychnins were it not so expensive, and then it kills so quickly that they would be found sticking in the holes, and prevent the others from getting a share.

QUALITY OF LONDON GAS.—Dr. Williamson, the chief gas examiner appointed by the Board of Trade, has reported, for the information of the corporation, the results of the daily testings of gas supplied by the Gas Light and Coke Company of London, during the past quarter. With regard to the illuminating power, the average in standard sperm candles was, at the Beckton testing place, 16.6; and at Friendly Place, Mile End, 16.4. This result was above that required by act of Parliament. As regards purity, at neither of the stations had there been any sulphureted hydrogen present in the gas. The average amount of sulphur present in other forms had been at Beckton; 13.4 grains per 100 cubic feet of gas, and at Friendly Place, 9.7 grains. Even the maximum at both stations was considerably less than that mentioned in the act. No returns of the pressure had been made from either station.

SANDAL WOOD IN FIJI.—The *Sydney Herald* says: "A large forest of sandal wood has been discovered in the center of Viti Devu. This is due to the active explorations carried on by Mr. A. Gordon, C. M. G. The forest, in order to preserve it from the fate of similar predecessors, has been 'tabu'd.' Some 20 logs of the wood were received in town the other day, and are very fine specimens of this valuable commodity. As an article of native trade in the Fiji and other groups, sandal wood stands unrivalled."

GOOD HEALTH.

The Standing of Alcohol.

I am recording a matter of history—of personal history, says Prof. D. B. Richardson, when I say that I, for one, had once no thought of alcohol except as a food. I thought it warmed us. I thought it gave additional strength. I thought it enabled us to endure mental and bodily fatigue. I thought it cheered the heart and lifted up the mind into greater activity. But is so happened that I was asked to study the action of alcohol along with a whole series of chemical bodies, and to investigate their bearing in relation to each other.

And so I took alcohol from the shelf of my laboratory, as I might any other drug or chemical there, and I asked it in the course of experiments extending over a lengthened period "What do you do?" I asked it: "Do you warm the animal body when you are taken into it?" The reply came invariably, "I do not, except in a mere flush of surface excitement. There is, in fact, no warming, but, on the contrary, an effect of cooling and chilling the body." Then I turned round to it in another direction and asked it: "Do you give muscular strength?" I test it by the most rigid analysis and experiment I can adopt. I test muscular power under the influence of it in various forms and degrees, and its reply is: "I give no muscular strength." I turn to its effects upon the organs of the body, and find that while it expedites the heart's action it reduces tonicity, and turning to the nervous system I find the same reply, that is to say, I find the nervous system more quickly worn out under the influence of this agent, than if none of it is taken at all. I ask it: "Can you build up any of the tissues of the body?" The answer again is in the negative: "I build up nothing. If I do anything, I add fatty matter to the body, but that is a destructive agent, piercing the tissues, destroying their powers, and making them less active for their work."

Finally I sum it all up. I find it to be an agent that gives no strength, that reduces the tone of the blood vessels and heart, that reduces the nervous power, that builds up no

tissues, can be of no use to us or any other animal as a substance for food. On that side of the question my mind is made up—that this agent in the most moderate quantity is perfectly useless for any conditions in life, to which men are subjected, except under the most exceptional conditions, which none but skilled observers can declare.

HOW THE ANCIENTS ATE.—Two or three thousand years ago, late suppers were not fashionable, as in the present degenerate age. The noble specimens of humanity of that day, whose deeds of valor and other wonderful achievements still inspire our respect, after a score of centuries, never formed the acquaintance of dyspepsia, that hydra-headed monster which renders miserable the lives of a large proportion of civilized human beings at the present day. This fact may be fairly attributed, in a great part at least, to the simple dietetic habits of those pioneers of science, art and civilization. Those noble Grecians who were the contemporaries and contemporaries of the great Hippocrates, the acknowledged father of medical literature, knew nothing of the elaborate courses, the infinite varieties, and the exquisite indigestibility of modern fashionable dinners. At that age of the world, man took but two meals a day, as do some at the present, a fact which is clearly stated in the writings of Hippocrates and other medical authors; from which it will be readily seen that in adopting the two-meal system one is but returning to the good old ways of his forefathers, rather than adopting any new or untried theory.

SO-CALLED MANGO BOILS.—An Ohio physician writes to the *Materia Medica* as follows: In India, during the height of the mango season, a severe form of furuncles is prone to occur, and these are called "mango boils," under the impression that eating this fruit produces them. Now, the mango ripens during the early portion of the rainy season, at which time malaria is most rife and virulent, owing probably to the rotting of the luxuriant tropical vegetation drowned by the water. The profuse rains soon wash off this decaying material into the streams, which carry it to the sea and also cool the atmosphere, and with these results their occurs a subsidence of the malarial fever and the mango boils. This fact in regard to the mango boil was furnished me by a very intelligent and cultivated Anglo-Indian, some 12 months since, to whom I had communicated my views on malaria.

PRETTY WELL, THANK YOU.—"Why, how d'y'do, Mrs. Careful—are all your folks pretty well?" asked one neighbor of another, whom she met in Hempstead a few days ago. "Oh, yes, pretty well, thank you—that is, about as well as usual. Father hasn't been quite well since he banked up the cellar last fall, and overworked himself—thinks he hurt his side. And mother has got the rheumatism so bad she has not been able to get down stairs for a week; Matilda Ann has a slight touch of the diphtheria, so the doctor says; Jimmie can't speak above a whisper, for a sore throat; Susie is just getting another rising in her ear, and the baby has had two more spells of croup. My husband can hardly do any work on account of his sore eyes, and I thought I'd die last night with neuralgia in my head—but we're all about as common. How's your folks?"

HARMLESS COLORS.—It is a well-known fact (and the *London Lancet* has recently called attention to it again) that at the present time it is almost impossible to find among the painted toys for children a single one that does not contain, in the colors used for its decoration, substances that are either positively poisonous or else injurious to the health. It seems probable that this important matter is soon to be remedied by the substitution, for the pigments now in use, of a series of perfectly harmless colors, which the experiments of M. Turpin have succeeded in producing. At a recent meeting of the Society for the Encouragement of National Industry, in Paris, M. Turpin exhibited a series of samples, showing every shade of every color necessary to fill out the entire chromatic scale of Chevreul.

HEALTH AND TALENT.—It is no exaggeration to say that health is a large ingredient in what the world calls talent. A man without it may be a giant in intellect, but his deeds will be the deeds of a dwarf. On the contrary, let him have a quick circulation, a good digestion, the bulk, thevessels and sinews of a man, and he will set failure at defiance. A man has good reason to think himself well off in the lottery of life if he draws the prize of a healthy stomach without a mind, rather than the prize of fine intellect with a crazy stomach. But of the two, a weak mind in a herculean frame is better than a giant mind with a crazy constitution. A lean pound of energy with an ounce of talent will achieve greater results than a pound of talent with an ounce of energy.—*Home Journal*.

CHEERFULNESS AT MEALS.—The benefit derived from food taken, depends very much upon the condition of the body while eating. If taken in a moody, cross, or despairing condition of mind, digestion is slower and much less perfect than when taken with a cheerful disposition. The very rapid and silent eating too common among Americans, should be avoided, and some topic of interest introduced at meals, in which all may participate; and if a hearty laugh is occasionally indulged in, it will be all the better.



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The Week.

The mineral specimens intended for the Paris Exposition have, during the past week, been shipped for their destination. For the dispatch used in getting them ready and finally shipped in good condition, Messrs. Paul and Hanks are entitled to much commendation. The entire collection consists of 69 cases, each about 20 inches square. Of these there are from Nevada, 23; California, 22; Cinnabar, 7; Arizona, 2; Utah, 2; Oregon, 5; duplicates, 2; miscellaneous, 6. They go by fast freight overland, consigned to J. W. Mackay.

It will be a gratification and relief to our people to know that our leading products will be fitly represented at the great show, the more especially in that we came so near failing of that end and that the specimens now sent forward will do us no dishonor. The forward and promising condition of the grain crop, noticed last week, has been further improved by the favorable weather since prevailing and already the preparatory notes for a great harvest are heard all over the land. The mines are already pouring out their precious treasures with a freedom hardly ever before seen, insuring also from this source a prolific harvest.

A Caution to the Restless.

It is now about the time of year for the California miner to experience a touch of the usual epidemic. Along about these days, as the almanacs say, the average prospector should begin to feel an itching desire to pull up stakes and be off in search of new stamping grounds. While this feeling of unrest has every year been undergoing some abatement it is far from being extinct, amply cause to keep it alive being, of course, never wanting. From some quarter or another there is sure to come such glowing accounts of strikes, nuggets and new discoveries as serve to produce in the souls of these credulous and hopeful people a lively fermentation; and while there may be no locality that just now attracts them strongly in any one direction, there are a number that offer such an aggregate of allurements as will be likely to draw largely on our nomadic population this spring.

First, there is Arizona, which offers, perhaps, as good a field as any outside of California for the mineral explorer. The drawback here is the cost of getting into the field and of carrying on operations after getting there. The railroad is not likely to be built across this Territory as soon as was expected, and capital is being invested in the mines there rather slowly. The mineral wealth of that country is great, but will not probably be developed as rapidly as was at one time anticipated. Of the Black Hills we have expressed an opinion elsewhere in to-day's paper, which is to the effect that, while the country may be an attractive one to the capitalist it is not such to the prospector or laborer, everything in the shape of mines being already taken up, while the low rates of wages that rule in the East must ultimately obtain there.

Glowing reports have been published lately about the South African gold fields, and which, if unfettered to go unexplained, may prove to come of our miners a delusion and a snare. A good many Californians as well as Australians have already visited that country in search of placer mines. None of them, however, remained or made any money, for the reason that the diggings, which are wholly occupied, are of limited extent and comparatively poor. The facilities for working them are also bad, water being scarce, the diggings deep, the country hot and dry and very difficult of access, because of its great distance from the seaboard and the hostility of the native tribes, who are warlike and opposed to the presence of the whites. We published not long since the opinions of Martin Durfee, an experienced Nevada prospector, who had just returned from these South African mines, well satisfied that they offered no inducement to immigrants from this Coast.

Certain of the Central American republics, more especially Guatemala, have also been bidding for population of late, representing their mineral resources as holding out strong inducements for immigration. Some of our California adventurers have been down in that region, too, looking after mines, but with so little success that if a reward of a thousand dollars were offered for proof that any one of them ever made enough to cover his traveling expenses, the money would never be claimed. And so, also, of South America—where is the California capitalist or explorer who ever got back a dollar of the money expended in or on account of mining ventures in that country? Disease and death and impoverishment have come out of these ventures, but never any pecuniary returns. A year ago there was much talk of hydraulic mines of a very remunerative kind being opened by California parties somewhere in Peru. If they have greatly enriched these parties it is singular that the latter should present the same eedy and impecunious appearance now that they did a year ago.

In reviewing these outside fields we can see little that should tempt the miner of either California or Nevada to go beyond the borders of these States, whether it be to prospect for mines or search after employment. Let him repress for the time being this desire to get up and leave for the distant sites of these rumored discoveries, and he will in good time learn how greatly they have been exaggerated and how much he has gained by remaining in one place. Let him stay where he is and in the course of a few months the rich croppings and big strikes, the black sulphurets, the yellow carbonates and the horn silver, will seem much smaller than at first, being discounted, perhaps, by the prospects obtainable everywhere around him.

THE HOWELL FURNACE.—In our last issue, when speaking of the cost of roasting in reverberatory furnaces, as compared with the "Howell improved 'White' roasting furnace," we stated that the cost of roasting in the latter was much less and would effect a saving of at least \$2.50 per ton. We should have said \$7.50 per ton instead of \$2.50. See the advertisement of the furnace in another column.

BODIE AND ESMERALDA.—The first of a series of letters from our special correspondent in these districts will appear in next week's PRESS. Both Bodie and Esmeralda are now attracting considerable attention from the mining community and the information in the letters of our correspondent will be interesting and valuable.

Pacific Coast Patents.

Out of the 13 patents granted to Pacific coast inventors, for the week ending March 26th, the list of which we give in another column, 11 were secured through Dewey & Co.'s MINING AND SCIENTIFIC PRESS Patent Agency. This fact shows more conclusively than any statement could the estimation in which this patent agency is held by the inventors of the Pacific coast, and the confidence they repose in it. It is not an isolated case by any means, as by far the larger proportion of Pacific coast patents are secured for the inventors through this agency. During the year 1877 there were upwards of 400 patents granted to Pacific coast inventors, and out of these 333 were forwarded through the MINING AND SCIENTIFIC PRESS Patent Agency.

This result has been brought about by careful attention to the requirements of clients, promptness, reliability, skill and experience in drawing up specifications and an accurate knowledge of patent office practice. An extensive and complete library has assisted very materially in our success in procuring patents, since we have, by reference to it, been able to so arrange our claims as not to conflict with prior inventions. This has enabled us to secure first-rates patents, which would stand any test. It has also saved a great deal of money to applicants, since we were able to inform them fully as to the state of the art to which their inventions more particularly referred before the applications for patent were sent to Washington.

A great many of the inventions made here are peculiar to the coast, and in these we have the best facilities possible for determining their value, having had experience in this city for so many years.

The patents procured through the MINING AND SCIENTIFIC PRESS Patent Agency comprise those invented not only in this State, but those from Nevada, Oregon, Washington, Idaho, Montana, Colorado, Arizona and Utah, which comprise the Pacific coast States and Territories. Our agency is well and favorably known to inventors throughout this large area of territory and by far the larger proportion of the patent business is done through us. It is a matter of pride to us to be enabled to say that after so many years in this business, which has to be transacted in a peculiarly confidential manner, our patrons should continue with us and the number of clients still increase.

Copper City, Shasta County.

We met Mr. A. C. Springer, recently, at Reading, and learned from him the following items concerning mines at Copper City. The town is located 25 miles northeast of Reading. Mr. Thompson, proprietor of the Stump hotel, runs a stage and express daily from Reading. One of the ledges most worked at present is the Winthrop. The shaft is 100 feet deep, connecting with a tunnel 190 feet in length. The ledge is about 25 in average width in the shaft. Over 550 tons of ore are already out, which is expected to yield \$30 per ton in gold and silver. The company is composed of Messrs. Spruance and Stanley, A. C. Springer and Thos. Mathison, of San Francisco. They own ground 1,500 feet in length, 600 feet in width, and have applied for a U. S. patent. By a novel system of operating the mine, yet to be completed by the company, the expense of steam hoisting works can be fortunately avoided for years to come. Mr. Springer has promised to give our readers the benefit of a description of the mine in due time. The Winthrop company was incorporated in December, 1877. They intend to erect a mill for reducing ore soon. The Extra mining company commenced work in November last. They have 4,500 feet of ground and two tunnels, 200 feet of ore exposed and some 300 tons of \$30 ore already out. The ore can be mined very rapidly. We saw a five-stamp battery on its way from Reading for this company, which will soon be in operation. They have a new saw mill already at work. The Potter mining company's claim, on Bully hill, is probably equally good as the above. The Crocker claim (unincorporated) is also reported first-rate. All show large bodies of ore, heavily charged with mineral, carrying silver, gold and copper, the former predominating. Wood and water are abundant and handy. A good deal is now being said about the bright prospects of this new town. It has half a dozen comfortable residences and a boarding-house, alive with 40 or more boarders. The U. S. Fishery, on McCloud river, is seven miles from Copper City. We look for remarkably favorable mining developments in this and other parts of Shasta county, this year.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Alexandria, April 1st, \$13,783; Hussey, 3d, \$5,200; Justice, 4th, \$25,900; Day, 4th, \$3,500; Tybo Con., March 31st, \$9,562.08; Manhattan, April 5th, \$16,000; Christy, 4th, \$4,471; Northern Belle, 3d, \$2,023.08; Con. Virginia, 6th, \$341,452.55; Standard, 6th, \$39,803.21; Grand Prize, 8th, \$18,500; Alexander mine, for March, \$16,451.19; Hussey, April 8th, \$4,400; Star, 5th, \$4,100; Grand Prize, 8th, \$18,500; Stonewall Jackson, March 22d, \$60,000; McCracken, April 8th, \$14,833.77; Hussey, 8th, \$4,400; California, 8th, \$300,770.76; Manhattan, 9th, \$15,951.48; Alps, 10th, \$1,500.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

STEAMING CANNED MEATS, FISH, ETC.—G. J. Ward, S. F. This invention is an improved device for steaming or cooking fresh meat, fruit or vegetables, more especially such as are to be sealed up in cans for preservation. It consists in the construction of an inverted metallic tank, secured to a base and made air-tight by means of hinged bolts holding a wooden packing between the metallic flanges, and also of movable trays and perforated bottoms. The said tank has a steam gauge and a pipe for the admission of steam, and also a pipe for the discharges of condensed water. Various methods have been employed for cooking hermetically sealed goods, but that most generally employed where the temperature is to be raised considerably above that of boiling water, is to place the cans in a solution of salt, chloride of calcium, or other suitable substance, the boiling point of which is considerably above that of water. The use of these solutions stains the cans, destroys some of the goods, and greatly increases the labor of handling, cleaning and packing. Mr. Ward's invention is intended to produce a mechanism which is easily operated, which may be opened and closed hermetically in a very short time, and in which a large number of cans may be handled easily, kept clean, and their contents cooked with rapidity and without variation. The pressure of the external steam, which is considerable, and in proportion to the increased temperature, tends to prevent the cans from being exploded by the act of cooking, and the percentage of loss is much less than when the cooking is done by a high temperature unaccompanied by a high pressure.

POCKET FOR CLOTHING.—Yung Chow, S. F. This is the second patent which we have secured within the past few years for a native of the Celestial empire, the patent in both instances covering improvements in clothing. The ordinary pocket openings in overalls, jumpers, etc., are subjected to severe strains at the corners, and various methods for strengthening them have been resorted to, such as rivets or strips of material, formed in cutting out the goods or independently, and sewed across the corner seams in the pocket. In this invention of Yung Chow's he does away with these devices by so constructing the pocket that there are no corner seams, and the cloth is continuous at the pocket points where the corners of the pocket openings are formed, so as to reinforce these points without the necessity of extra pieces of any sort.

PICKER AND FEEDER FOR THRESHING MACHINES.—Wm. L. Mery, Chico, Butte county. Mr. Mery's invention relates to certain improvements in mechanism for feeding unthreshed straw to the cylinder of a threshing machine, and it consists in a novel construction of a series of rotary feeders, placed one after the other in a feeding trough or spout, and these feeding cylinders are provided with arms or pickers. The pickers are mounted upon shafts extending from end to end of the cylinders, and the shafts are so operated by cams at the ends as to be alternately moved in a radial position, where they are locked until they have carried the straw to a point where it is to be delivered to the next cylinder, when the arms are allowed to fall and lie against the cylinder so as to free themselves from the straw until they have made a partial revolution, when they are again projected to their radial position.

SACK HOLDER.—Covert, Garner and Walthall, Modesto. This is an improvement in a patent granted to John S. Covert, August 28th, 1877. The improvement consist in mounting the frame which carries the adjustable sliding bars and sockets upon a portable vertical standard in such a manner that the holder may be elevated or depressed to suit any height or size of sack. The invention also consists in extending the tubes or sockets which receive the sliding bars through the axis or bar on which they turn, so that the slides may be as long as desired; and lastly in the employment of a spring catch by which the holding bars are held up out of the way when desired.

PENCIL POCKET.—Samuel Hill, S. F. This is an improved device for holding a pencil when it is out of use, and in a convenient position for use at any time. It consists in the construction of a metallic tube having a pin attached for the purpose of fastening the device to the coat or vest. This tube has openings made in the sides through which the pencil may be grasped by the thumb and finger to remove it. The elasticity of the case is such as to retain the pencil in place when not wanted.

SINGLE BEAM HARROW.—John M. McPike, St. Helena, Napa Co. The "single beam harrow," as the inventor calls it, is an attachment for plows. It is more especially applicable to gang plows, and consists of a single beam provided with inclined teeth, so constructed as to clear themselves. It also consists in a method in attaching and adjusting the harrow. With this device the harrowing and plowing can be done at one operation, saving both time and labor, while a peculiar diagonal motion given to the implement makes it do its work very thoroughly.

Devices for Unloading and Stacking Hay.

We illustrate herewith an arrangement, patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by George F. Kelley, of Susanville, Lassen county, for harvesting purposes, comprising a method of unloading wagons rapidly as they come from the field, and, at the same time, piling the hay, grain or straw up in a stack. This operation is all performed by horse power; no hauling is necessary after loading the material on to the netting in the wagon in the field. The arrangement also comprises a method of depositing hay or grain at one operation into a barn, which is done by rolling the load from the wagon on to a peculiarly-constructed car, which conveys the load up into the barn and dumps it in the proper place. The whole operation is performed rapidly and with very little labor, so that the time occupied in either stacking hay or grain or putting it into a barn is very small as compared with the methods usually practiced.

Fig. 1 of the engravings shows in a general way how the unloading of the wagons is accomplished and how the stack is made. A netting is laid in the harvesting wagon, on which the load is placed. This netting has on its lower side a number of rings, which engage with hooks on the lower side of the wagon. On the upper edge of the netting is a ring, to which a rope may be attached. When the wagon with the load arrives at the place where a stack is to be formed, a rope is fastened to the ring on the upper side of the netting and a horse hitched to the other end. When the horse starts ahead he draws on the upper side of the netting, and, the lower part being fast to the wagon, the load is rolled over on to the ground, when the netting comes on top of the load. Then the rope is detached, the netting replaced on the wagon and it is ready to receive another load.

No pitch-fork is needed to remove the load and a boy can fasten the rope and drive the horse.

Now, this plan is adapted to forming stacks eight or ten feet high, but for greater elevation, a little different arrangement has to be made. The same netting with the rings, is placed in the same wagon, as described, but a supplemental netting is required.

Off to one side of the stack, opposite to where the wagons drive up, is placed an upright pole, suitably braced. On top of this is placed a sheave, over which a rope is led and down to a pulley on the lower side of the pole, after passing under which it may be attached to a horse. The other end of this rope has a hook, which is intended to engage with the ring on the upper side of the wagon netting.

To the lower end of the upright post is fastened another rope, by hook and ring, which is attached at its other end to the extension net.

Now, when the wagon drives up alongside the stack, this rope hangs over the stack, with the extension net on the side where the wagon is. By fastening the hooks in the extension-net to the rings in the wagon-net, they both become virtually one. Now, the hook on the end of the rope passing over the sheave on top of the pole is engaged with the ring in the wagon-net on the upper side. When the horse which is attached to this rope starts up, the load in the wagon begins to roll over towards the stack, and, as the horse keeps on, the load is rolled up the side of the stack on to the top. When it is in place, the man on the stack draws the upper rope back, unhooks the wagon netting and places it back into the wagon. He then spreads the extension-net down beside the stack in place for the next wagon. The driver

of the horse unhooks the lower rope from the post and the man on the stack draws it from under the last load and throws it again over the stack ready for the next load.

When hay or grain is to be stored in a barn loosely, as it comes from the field, additional appliances are necessary, although the netting first described is used for dumping the load. To get the hay into the barn, a frame-work is built on an incline to the highest practicable point, on which a small track is laid. This frame-work and track are carried on as high a plane as possible, lengthwise through the barn, and the incline and track outside are extended along on the ground far enough for the car

the uprights are fastened is hinged at its lower end. Now, when the car has its load on, the platform rests on the hinged central longitudinal bar and on the uprights attached to the side-hinged longitudinal bars. When it is desired to dump the load, by pushing on the upright lever, the side bar is thrown over, carrying with it the uprights on which the platform rests, and then allowing that side of the platform to drop and letting the load slide off. The anti-friction rollers on the ends of the uprights, on which the platform rests, allow of this action being performed easily. By this means the load is quickly and easily dumped in any position. A brake is attached to the car so

and associates. It will be reported by Ganse, of Arkansas. The committee adopted sundry amendments, clearly defining the boundaries of the proposed grant and more explicitly providing that the title to lands shall not be acquired except on the payment of their present appraised value, to be made after furnishing proof that they have been thoroughly reclaimed by irrigation.

The Constitutional Convention.

Perhaps the most important bill of the session is that calling the Constitutional Convention. Its provisions have been before given as described by the correspondent of the *Bulletin*, but they may be of interest to repeat as the next important issue to be presented to the people of the State. The convention will consist of 152 delegates, 120 from senatorial districts and 32 at large. Eight from each senatorial district. The people throughout the State will vote for all the delegates at large, but the eight receiving the highest number of votes, residents of each senatorial district, are to be declared elected. One hundred and twenty delegates are to be elected for the Senatorial districts, in proportion to the representation in the last Legislature. But in Tulare, Fresno, Kern, Inyo and Mono, instead of electing delegates in the same manner as Assemblymen and the Joint Senator are elected, each of the three first named will elect one delegate each, and one delegate will be elected from Inyo and Mono. The three representatives to which Ventura, Santa Barbara and San Luis Obispo are entitled are to be elected one from each county. So will the counties of Colusa and Tehama. Each of these will elect one delegate. The election for delegates will be on the third Wednesday in June. The Convention is to meet on the 28th of September at Sacramento. The question of adopting the Constitution framed by the Convention will be submitted to the people on the first Wednesday in May next year.

Concerning the cost of the Convention the *Bulletin* says: The sum of \$100,000 is appropriated for the purposes of the Convention and all the necessary powers are conferred for conducting business. The members of the Convention will receive mileage and \$10 per day for 100 days. After that time, if the Convention is longer in session, the members must serve from pure patriotism.

San Francisco will have 30 delegates elected from the city at large, one also jointly with San Mateo, and eight of the thirty-two delegates at large must be residents of San Francisco, as constituting the First Congressional District. This will give San Francisco 39 delegates out of 152. The voters of San Francisco at the election will vote for 30 delegates, representing the city according to the Legislative apportionment, one jointly with San Mateo and 32 at large, making a total of 63

names on the ticket. The prominent members in the recent Legislature representing both of the great parties, have repeatedly expressed their willingness to sink party in selecting delegates, but whether this can be effectually carried into effect remains to be seen.

THERE is a strike on the Atchison, Topeka and Santa Fe railroad. Several engines have been ditched at Emporia, and two attempts have been made to fire the railroad buildings at Topeka. The sheriff has been on the ground with a strong posse to guard the road. The company declare that they will make no concessions to the strikers.

THE test made by the steamship *Dakota* of the Puyallup coal, proved satisfactory.



FIG. 1. KELLEY'S DEVICE FOR UNLOADING WAGONS AND STACKING GRAIN.

which runs on the track to be on a level when the load is brought to it by the wagons. A general view of this arrangement is seen in Fig. 2.

Now, when the wagon with the load of hay is driven up alongside the car, the load is rolled off by means of the netting, as previously described, and falls on to the car. A rope, fastened to the center of the car, passes up between the tracks and clear through to the further end of the barn, where it is passed around a drum on a vertical pole, as shown in the drawing. This forms a windlass, to which a horse is

that it can be let down the incline to the ground again gradually.

These devices have been practically applied during last season with complete success. Mr. J. D. Byers, a well known farmer and stock man at Honey Lake, considers the unloader and stacker superior to any yet produced. He took out an expensive horse tramway from his barn last year and substituted the Kelley device, greatly to his satisfaction. A number of other farmers in Honey valley, who have seen the device at work, also agree in recommending it.

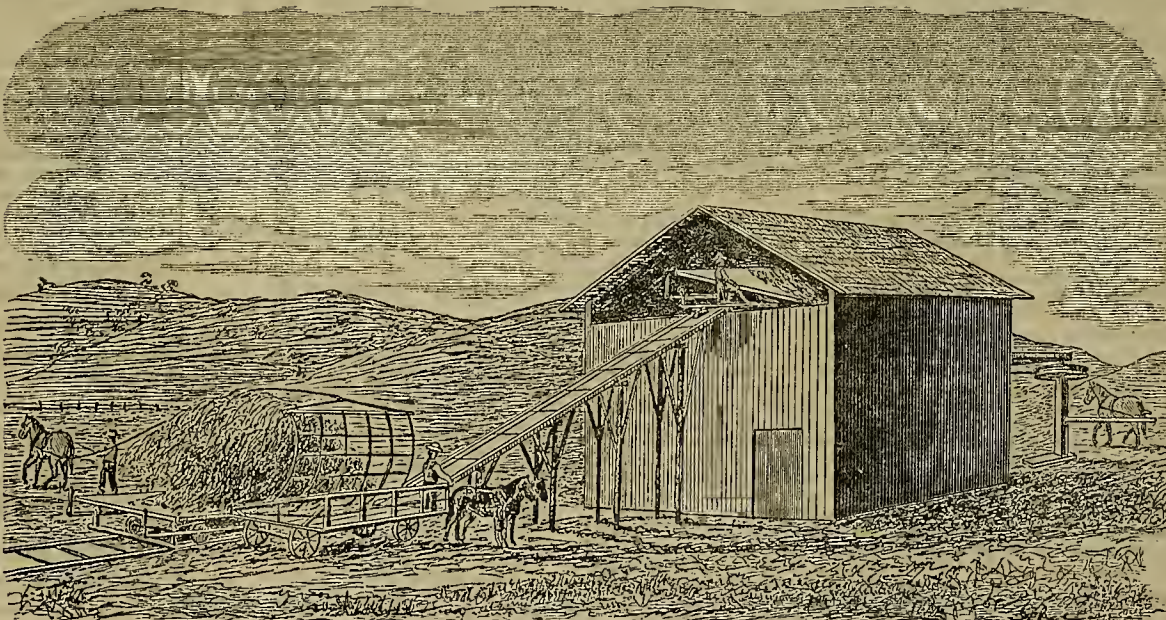


FIG. 2. KELLEY'S METHOD OF FILLING BARN WITH HAY OR GRAIN.

attached by means of a pole or beam, as shown, and, as he walks around in a circle, the rope is coiled around the drum, and the car, with its load, is drawn up on the track into the barn, where the load is dumped in the position required.

The car used for this purpose is of peculiar construction, but quite simple. The trucks are quite low, and a large platform is hinged by longitudinal central hinges to the middle timbers of the car, so that the platform may be tilted in either direction. On the outside frames, under the outer edges of the platform of the car, are several uprights, all mounted on one bar, which has a lever at one end. The tops of these little uprights have anti-friction rollers in their ends and on these the outer edges of the platform rest. The bar on which

Those desiring further information should address Geo. F. Kelley, Susanville, Cal.

THE receipts of treasure at San Francisco for the quarter ending March 31st, through Wells, Fargo & Co.'s Express, amounted to \$20,418,400, or nearly five million more than for the same quarter last year; \$13,823,700 was in dore silver, \$2,680,000 in gold dust and bars, and \$3,914,700 in coin.

THE COLORADO DESERT.—A dispatch from Washington says that the House Public Lands Committee has agreed to recommend the passage of Wigginton's bill providing for the reclamation of Colorado desert by Wozencroft

FOREIGN PATENTS.

MINING AND SCIENTIFIC PRESS PATENT
AGENCY, SAN FRANCISCO, CAL.

In offering the following circular and price list for foreign patents, to our clients both past and future, we have been careful to give the information contained in it in such a condensed form that the inventor can see at a glance the principal facts which he is desirous to know concerning each country, and without the confusion which more detail would add.

When the inventor has fully decided to apply for patents in certain of these countries, we are always ready to give any further information that may be needed.

Our practice has always been to prepare all the papers for patent applications in English speaking countries, so that the inventor may sign them and take out his patent in his own name.

We have skillful and reliable agents in every principal country in the world, and with the experience of the past and our present knowledge, we feel sure that we can give satisfaction to all who are willing to pay a fair price for thoroughly good, conscientious work.

Our rates have been reduced somewhat, and will, we think, be found more favorable in the aggregate than those of any other house.

The importance of obtaining patents in foreign countries, is obvious to all American inventors; but owing to the expense formerly attending these applications, and also to a lack of information on the part of inventors, as to the requirements in introducing and working their inventions, not as much use has been made of the patent privileges of these countries as might have been expected under other circumstances.

The patent laws of many countries, and notably Germany, have been very much improved of late years, and the rights of inventors are much better protected, now as the advantages which a country derives from inventions are better understood and appreciated.

The immense agricultural and manufacturing interests of many of these countries makes the introduction of improved machines and methods of greater importance, and renders the return to the enterprising patentee more certain and remunerative.

In France, Belgium, Austria, Germany, and some other European states, the patent becomes void upon the expiration or lapse of a patent of prior date, obtained in another country; and as in some of these states the specifications are published immediately after application, it is best to take out patents in all the countries in which it is desired to protect the invention, simultaneously.

In France and some other countries, medicines, articles of food, pharmaceutical compounds, and some other inventions are not patentable, although the processes may be; and in some countries warlike inventions are not patented, but are often appropriated by the government upon their own terms.

In England, France, Belgium and Spain, patents are usually granted if in their proper form, while in Germany, Austria, Russia, Sweden and Denmark, an examination is made, and all claims not considered novel are refused.

Germany especially, however, protects her patents, and punishes infringement as a criminal as well as a civil offense. In most of the countries, except England and the colonies, the patent must be worked in the country, and the working officially proved to the government within a certain time, or the patent will be forfeited; but, except in Austria, we can have the patent properly worked for a comparatively small sum of money. The Austrian law, however, requires the machinery to be manufactured in that country. In any case, however, if the patent be sold or disposed of, this difficulty is avoided by the inventor.

Australian Colonies.

See our special circular giving full information for these colonies.

Austria.

The term of an Austrian patent is limited to fifteen years, but the patent may be taken for a shorter period, and prolonged if desired. The invention must be worked in the empire within a year from the date of the patent, and becomes void upon the expiration of a patent of prior date obtained in any other country.

The cost of an Austrian patent, with all expenses paid for the first year, is \$100. A small yearly payment must be made to prevent the patent from becoming void.

Belgium.

Patents are obtainable in Belgium for twenty years, but if patented abroad, the patent will expire at the same time with the original patent. The patent must be worked within a year of the time of its being worked abroad. A government tax is payable each year, beginning with ten francs and increasing ten francs each year.

The expense of obtaining a Belgian patent is \$90.

Brazil.

Imperial diplomas, possessing the legal force of patents, are granted for terms of from five to twenty years to inventors or importers of inventions. No tax is demanded by government, but the inventions must be worked within two years.

The expense of a Brazilian patent is \$300.

Canada.

The patent law of Canada is modeled after,

and similar to that of, the United States. Patents are granted in Canada for terms of five, ten or fifteen years, the shorter terms being extensible. A model is required for this province; also a petition and duplicate set of papers of special sizes. The invention must be worked in the province within two years after the date of the patent. The Canadian patent extends to all the provinces north of the United States, known as British America, and must be applied for within twelve months of the date of an American or foreign patent.

The cost of a Canadian patent, including express charges on model, etc., is \$65, and upwards.

Denmark.

The terms of a Danish patent varies from three to twenty years, being fixed by government. Patents of importation do not usually exceed five years. The invention should be worked within one year.

The expense of a Danish patent is \$100.

East Indies.

An East Indian patent is granted for a term of fourteen years, and must be for a new invention of public utility. The applicant must be the inventor, his executor, administrator, or assignee, and may be a resident, non-resident, British subject, or alien. The papers necessary are a petition, declaration, specifications and drawings, together with five copies, one for each of the Presidencies. The time of working the patent is not limited.

The cost of an East Indian patent is \$300.

France.

The term of a French patent is fifteen years, but is limited by the duration of a prior patent in a foreign country. The invention must be worked within two years of the date of the patent. A payment of 100 francs (\$20) must be made each year, or the patent becomes void. No model is required. The papers necessary are a petition, specification and drawings, in duplicate.

The cost of a French patent is \$100.

German Empire.

Under the law of June, 1877, patents may now be taken out for the entire German Empire. The duration of the patent is fifteen years. A valid German patent cannot be obtained if the specification has been published in any way before the German application is made. It should therefore be made before the issue of the American or English patent. The patent must be worked within three years of the grant. Models are only required in special cases, as in firearms. Specifications and drawings must be furnished in duplicate and of special sizes. An annual tax is payable, beginning with £3 the second year and increasing by £2 10s. each year. The expense of a German patent is \$100.

Great Britain.

A British patent includes England, Ireland, Scotland, Wales, the Isle of Man and the Channel Islands, but no colonies, as these have their own patent laws. The duration of a British patent is fourteen years; but in order to prevent it from expiring, a tax of £50 must be paid at the end of three years and £100 at the end of seven years. It is not imperative that the patent should be worked within a given time, but it is, of course, for the interest of the patentee to introduce his invention. A model may be deposited in the Patent Office museum, if desired, and will often assist in introducing the invention. The patent is granted to the one who first introduces it, and will not be sustained by the courts if it was publicly known in Great Britain before the date of the patent. No examination is made as to the novelty of any invention for which a patent is asked.

There are two methods of taking out a patent. The first is by filing a provisional specification, as it is called, and then filing a final or complete specification within six months afterwards. In the second, the complete specification is filed with the petition, and the patent is completed at once.

The disadvantages of filing a provisional specification are, the short time which elapses before the final specification must be filed, to prevent losing the patent; and the fact that whoever files the complete specification and obtains the great seal first, will hold the patent, even if another has a provisional specification on file, besides the chance of mistakes in completing the final specification. The patent may be taken out in the name of the foreign agent and afterwards assigned to the inventor, which is the usual practice, or the papers may be completed so as to be signed by the inventor himself, and the patent be taken out in his own name. The latter is our method. The documents necessary are a petition, declaration, specification, on parchment, and drawings in duplicate. No model is required, but the drawings should be very explicit. The expenses of a British patent is \$250.

Italy.

The patent may be taken out in this country from one to fifteen years. If taken out for a shorter period, the patent may be extended by the payment of a tax of about £1 16s. for each extension. Patents for less than five years should be worked within one year. Those over five years, within two years; but the time may be extended upon a proper showing. A tax of £3 is payable the second year, increasing by £1 every third year. The documents required are a petition, specification and drawings in triplicate.

The expense of an Italian patent for six years is \$200.

Norway.

A Norwegian patent is granted for from five to ten years, the duration being fixed by government. The invention should be worked within two years from the date of the patent. No annuities are demanded. The documents required are a petition, specification, and drawings in duplicate.

The cost of a Norwegian patent is \$175.

Portugal.

The terms of a Portuguese patent is fifteen years. A tax of £2 is payable annually. The government reserves the right to appropriate inventions of public utility, an indemnity being paid to the owner.

The cost of a Portuguese patent is \$300.

Russia.

Russian patents are granted for three, five and ten years; no extension of the terms for which it was originally issued being allowed. Inventions may be patented in the empire if not publicly worked previously, whether patented elsewhere or not. The patentee may be the inventor, or his assignee, either a native or a foreigner. An examination made, as to novelty, correctness, etc., and patents are sometimes refused. The patent should be worked within one-fourth the time for which the patent is granted, and proof of the practical workings should be deposited with the Ministry within six months after such working. The importation of the patented article does not affect the validity of the patent.

The cost of a Russian patent for five years is \$300; for ten years, \$600.

Sweden.

The duration of a Swedish patent is usually ten years, and the invention must be worked within two years. There is an examination as to novelty. No model is necessary. The documents required are a petition, specification and drawings.

The expense of a Swedish patent is \$175.

Spain.

The duration of a Spanish patent is fifteen years, but the patent may be taken for five years and renewed. It must be worked within a year from the date of the patent. No strict examination is made; no model required. The documents necessary are a petition, specification and drawings.

The cost of a Spanish patent for five years is \$250.

Other Countries.

The following countries are of lesser value to patentees in general than those before mentioned; but in some cases patents may be advantageously taken for these countries also:

COUNTRY.	ALL PAID FOR.	PRICE.	EXTENSION TO.
Antigua.....	7 years	\$250	14 years
Barbadoes.....	14 "	250	"
Bolivia.....	20 "	275	30 "
British Guiana, and Demanara.....	7 "	275	21 "
Ceylon.....	14 "	300	28 "
Case of Good Hope.....	3 "	200	14 "
Chili.....	10 "	300	20 "
Cuba, Porto Rico and Philippines.....	5 "	300	15 "
Dominica.....	14 "	250	"
Ecuador.....	20 "	250	30 "
Falkland Islands.....	14 "	250	"
Grenada.....	14 "	250	"
Greece (application).....	"	200	"
Hong-Kong.....	14 "	250	"
Jamaica.....	14 "	250	"
Honduras.....	14 "	200	"
Japan.....	14 "	250	"
Mauritius.....	14 "	250	21 "
Mexico.....	10 "	350	"
Paraguay.....	5 "	250	10 "
Peru.....	20 "	300	30 "
Argentine Confederation.....	"	250	20 "
Tobago.....	14 "	250	"
Trinidad.....	14 "	300	21 "
Turkey (application).....	10 "	300	"
Uruguay.....	10 "	250	20 "
Venezuela.....	15 "	250	50 "

Our general circular of hints and information for inventors and patentees will be sent to any address on receipt of postage stamp. Also our special circular for the Australian Colonies and India.

DEWEY & CO.,

UNITED STATES AND FOREIGN PATENT SOLICITORS.
OFFICE OF THE "MINING AND SCIENTIFIC PRESS"
AND "PACIFIC RURAL PRESS," SAN FRANCISCO,
1878.

From A Patentee.

HUNSAKER, TULARE Co., CAL., Jan. 15, 1878.
* * * * * You will now receive my grateful, heartfelt thanks for the able manner in which you have conducted the interest intrusted to you by me. Your acknowledged ability, confirmed to me as it is by the successful presentation of my claim for a patent on a pump power, not only delights me, but suggests the propriety of my continued patronage and that of all my friends. With kind wishes for your future success, I subscribe myself, yours respectfully,
A. L. HUNSAKER.
Messrs. DEWEY & Co., Patent Solicitors, S. F.

SAN LORENZO, December 6th, 1877.

Messrs. DEWEY & Co.—Gentlemen: I received the Letters Patent for my invention on the 5th inst., and beg to thank you for the gentlemanly and business-like manner in which you have dealt with me from the beginning of my application. I shall always feel it a pleasure to recommend you to all I come in contact with who need Letters Patent. Respectfully,
WM. DALE.

KUSTEL'S CONCENTRATION OF ORES (of all kinds), including the Chlorination Process for Gold-bearing Sulphurets, Arseniurets, and Gold and Silver ores generally, with 120 Lithographic Diagrams, 1867. The most complete treatise. Published at this office. Price, \$7.50. Postage, 50 cents extra.

FORTY
ACRE
FARMS.

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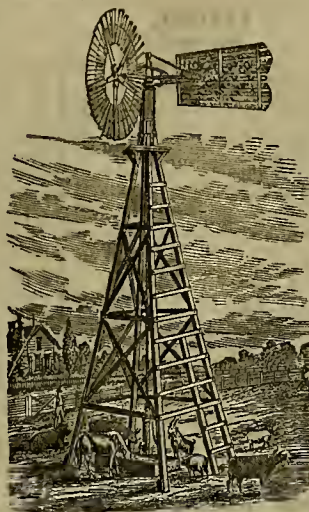
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FINE RANCH FOR SALE.

LOWEST PRICE, \$8,000.

The ranch is situated on the direct stage road between
Mendocino City and Cloverdale, in Mendocino County.
Forty miles from Cloverdale, 20 miles from Navarro
Ridge and one mile from the Christine Postoffice.

It Consists of a Total of 2,000 Acres,

Of which 640 are secured by Government title and the
balance by possessory title. It consists of

150 Acres of Rich Bottom Land,

Which is adapted to the raising of Wheat, Barley, Oats,
Potatoes, Corn, Vegetables, etc., and will raise as large
crops as any land in the county. There is 1,210 acres
of Fine Rolling Land which is A No. 1 pasture land, and
capable of keeping 1,000 head of Sheep, or 100 Dairy
Cows. The whole ranch is well fenced with picket and
post and rail fence, and has eight good buildings on it,
consisting of a good substantial and comfortable

Dwelling House of Six Rooms,

Two Barns, one of them 100x40 feet, and the other 40x40
feet, a Granary, Woodshed, Chicken House, and a No. 1
Dairy House, new last year. There is a bounteous and
never failing supply of good soft water at both the Dwelling
and Dairy Houses.

On the ranch is a large quantity of Redwood timber,
suitable for all purposes. There is a

Fine Orchard of Some 300 Trees,

Of the choicest varieties of Peach, Apple, Pear and Plum,
as well as a large quantity of Grapevines, Currant and
Gooseberry bushes, and other small fruit. There is 100
acres sown to Wheat and Barley, which is now up four or
five inches, and promises an abundant harvest in the
fall.

The owner has also about 40 head of Cattle, a few
Sheep, five horses, 150 head of hogs, 100 Hens, and a large
supply of all necessary Farming Utensils, which he will
dispose of to the purchaser at very reasonable terms if
desired.

The neighborhood is as good as could be desired, only
one mile from to a store and one-half mile to a good
schoolhouse, as well as one-half mile from a church.

The owner's reasons for selling are his wife's health
and his dislike of the business. At the price at which it is
offered it is the cheapest ranch in Mendocino County, as
the crop bids fair to be worth when harvested, \$4,000.

Terms are \$3,000, one-half cash and the balance se-
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Sure Crops Every Year.

The Reading Ranch,

In the Upper Sacramento Valley, originally em-
bracing over 26,000 acres of

Choice Grain, Orchard and Pasture Land,

Is now offered for sale at low prices and on
favorable terms of payment,

In Sub-Divisions to Suit Purchasers.

The ranch was selected at an early day by
Major P. B. Reading, one of the largest pioneer
land owners in California. It is situated on
the west side of the Sacramento River and ex-
tends some 20 miles along its bank.

The average rainfall is about 30 inches per
annum, and crops have never been known to
fail from drouth.

The climate is very beautiful and compar-
atively desirable. The near proximity of high
mountain peaks give cool nights during the
"beated terms" which occur in our California
summers.

Soft well water—remarkably sweet, pure and
healthy—is obtainable at a depth of from 15 to
35 feet.

Wood is plentiful and easy to get.

Figs, Grapes, Peaches, Prunes, Almonds, En-
glish Walnuts, Oranges and other temperate
and semi-tropical fruits can be raised with suc-
cess on most of the tract. Also, Vegetables,
Corn and all other cereals ordinarily grown in
the State.

A considerable amount of the rich bottom
land has already been cultivated.

Deep Soil With Lasting Qualities.

The soil throughout the tilled portions of the
ranch proves to be of great depth and enduring
in its good qualities. It is quite free from foul
growths. The virgin soil among the large oak
trees on the bottom land is easily broken up
and cultivated.

The California and Oregon railroad traverses
nearly the entire length of the tract. There
are several sections, stations and switches, be-
sides depots at the towns of Anderson and
Reading—all of which are located within the
limits of the ranch.

For Colonies.

Land suitable for settlers in colonies can be
obtained on good terms.

Town Lots

Are offered for sale in Reading, situated on the
Sacramento River, at the present terminus of
the railroad. It is the converging and distrib-
uting point for large, prosperous mining and
agricultural districts in Northern California and
Southern Oregon. Also, lots in the town of
Anderson, situated more centrally on the
ranch. Lots in both these towns are offered
at a bargain, for the purpose of building up the
towns and facilitating settlement of the ranch.

Purchasers are invited to come and see the
lands before buying here or elsewhere. Apply
on the ranch, to the proprietor,

EDWARD FRISBIE,

Anderson, Shasta Co., Cal.

News in Brief.

JOHN MORRISSEY is getting better. MARSHAL BAZAINE is hard up and in Spain. The Sacramento river is falling steadily at Colusa.

SAN DIEGO has had 12.45 inches of rain for the season.

THE new City Hall is to be painted a lead color.

COMMISSIONER McCORMICK has arrived in Paris.

The wife of Bonner, of the New York Ledger, is dead.

THERE were 18 rainy days in March, rainfall 4 1/2 inches.

ALFALFA is already three feet high in Kern county, and not yet in blossom.

WILLIAM IDE was shot and killed while asleep at Foster, R. I., by his wife.

A MAN named Laughlin committed suicide at Chico with morphine.

THERE are in the Napa insane asylum 256 male and 186 female patients.

The city of Oakland will receive about \$1,500 a month less hereafter for liquor licenses.

THE ceremony of unvailing the James Lick statue at Frederickton (Pa.) occurs April 22d.

Gov. IRWIN signed the bill allowing women to become attorneys in all the courts of this State.

THE Brotherhood of Locomotive Engineers on the Lehigh & Susquehanna railroad has probably disbanded.

THE fortune left by the notorious Madame Restell is estimated at from \$850,000 to \$1,000,000.

THE Kimball Manufacturing Company are at work on an order for thirteen street cars for one of the Oakland roads.

At Chester, Pennsylvania, Clemens Lloyd in a jealous freak killed his wife and then committed suicide.

THE farmers in many parts of the State have either cut or fed down their growing grain to prevent its lodging.

THE Scotch Protestants are organizing a vigorous agitation against the establishment of the proposed Papal Hierarchy.

GARIBALDI is lying sick in Caprera, and in all probability will not be able to visit the exhibition at Paris.

THE Police Commissioners have granted Senator Bones' application to carry concealed weapons.

THERE were 111 deaths in this city last week, of which 60 were males. Diphtheria caused seven deaths.

It is reported that Theodore Tilton and his divorced wife Elizabeth have become reconciled and will live together once more.

SEVEN of those injured by the oil explosion, caused by the collision of trains at Slatington, Pennsylvania have died.

The Sutor tunnel is still 866 feet from the Savage. The tunnel was advanced 87 feet last week.

FIVE persons were killed and several injured by a steamboat explosion on the Sandy river, Tenn., one week ago.

A LITTLE girl named Josephine Flood fell through a hole in Main street wharf last Sunday and was drowned.

L. C. FORD, a pauper lunatic, set fire to the Stuen county poorhouse, N. Y., on the 6th inst, burning up the building, himself and 15 other inmates.

W. H. CILLEY, partner of Harry Meiggs, is pushing through the gigantic projects which the great Peruvian railroad builder had on hand at the time of his death.

THE entire rainfall for the season up to April 1st, at Grass Valley, has been 50.41 inches, at Sutter Creek, Amador county, 32.55, at San Diego, 12.50.

THE titling receipts of the Mormon church in Utah amounted last year to \$445,000. At a late church conference 57 missionaries were appointed to go to Europe.

MRS. JENNIE FOWLER, a performer in the Opera House at Pawtucket, in attempting to shoot an apple from the head of another performer, Mlle Volante, shot her through the forehead, killing her instantly.

ON Saturday last, James Smith and Pahl Castro rode at the Oakland trotting park a 50 mile race, using ten horses each. Castro came out three lengths ahead, winning the race in two hours and seven minutes, the animals rode being mostly mustangs.

UPWARDS of 25,000 people, including President Hayes and many other distinguished persons witnessed the successful launching of the City of Para, the second steamer of the Brazilian line, at Philadelphia, on April 6th.

THE Mechanics co-operative company have purchased the large silk factory with appurtenances erected in Visitation valley several years ago. This establishment will be put in good order for the purpose of carrying on the silk manufacturing business.

JOHN W. AMES, United States Surveyor General for California, died at San Rafael, April 6th. He was a grandson of the eloquent Fisher Ames of revolutionary renown, and served with great distinction in the late war of the rebellion, having taken part in all the battles of the army of the Potomac.

A MAN, supposed to be a German, was killed, last week, on the San Joaquin railroad bridge. He was seen by the engineer a quarter of a mile away, who whistled for him to get off the track. On seeing the train, he threw his blankets and satchel into the river and remained standing until he was run over and killed.

THE Manchester, N. H., Print Works have shut down temporarily on account of dull times.

A RESOLUTION to amend the Massachusetts constitution in favor of woman suffrage was refused a third reading in the Senate by 19 to 16.

No public house is allowed to remain open in Victoria on election days, neither can liquors be sold or given away, under a heavy penalty.

LAST week a 50-horse power hoiler in the Boston stamping manufacturing company exploded, killing three men and wounding seven others, one of them fatally.

JOEL H. COLTON, who kept a saloon 19 miles from Sacramento, on the Cosumnes road, blew his brains out the other day in the presence of his wife. Cause, chronic intemperance.

THERE were 245 sales of real estate effected in this city during the month of March, aggregating \$1,138,393, this having been one of the dullest months experienced since 1870.

WILLIAM REGAN, a native of Ireland, 46 years of age, dropped dead in a cell at the city prison a few nights since. He was a confirmed inebriate.

NAVIGATION on the great lakes is practically open a month or six weeks earlier than usual. The ice has been less than in any season within 40 years.

For the first time in the history of the Territory of New Mexico, the records of the legislative body are this winter being kept in English, instead of, as heretofore, in Spanish.

FRESNO COUNTY farmers are talking of cutting a large quantity of wild hay this season, something unprecedented in the farming history of that region.

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING, MARCH 26TH.

POCKET.—Yung Chow, S. F.

SASH HOLDER.—R. D. McLennon, Los Angeles, Cal.

WATCH CASE SPRING.—P. F. Nilson, Santa Rosa, Cal.

BAG HOLDER.—J. S. Covert, M. D. Garner and L. B. Walthall, Modesto, Cal.

PENCIL POCKET.—S. Hill, S. F.

PUMP SUCTION PIPE.—E. O. Lurms, Gold Hill, Nevada.

STAMP MILL.—J. M. McFarland, Virginia City, Nevada.

HARROW ATTACHMENT FOR PLOWS.—J. M. McPike, St. Helena, Cal.

FEEDER FOR THRESHING MACHINES.—M. L. Mery, Chico, Cal.

CAR STARTER.—J. Pritchard, S. F.

GATE.—A. G. Rockfellow, Ashland, Oregon.

COOKING APPARATUS.—G. J. Ward, Jr., S. F.

SAND AND EARTH ELEVATOR.—G. W. Cranston, S. F.

Signal Service Meteorological Report.

Week Ending April 9, 1878.						
HIGHEST AND LOWEST BAROMETER.						
Apr. 3	Apr. 4	Apr. 5	Apr. 6	Apr. 7	Apr. 8	Apr. 9.
29.88	29.90	29.91	29.84	29.80	29.80	29.86
29.78	29.86	29.76	29.78	29.74	29.73	29.77
MINIMUM AND MAXIMUM THERMOMETER.						
63	64	63	63	70	69	69
52	54	54	53	54	56	54
MEAN DAILY HUMIDITY.						
75.	71	79	82	73	70	70
PREVAILING WIND.						
W	W	SW	SW	SW	SW	SW
WIND—MILES TRAVELED.						
102	173	141	267	134	115	155
STATE OF WEATHER.						
Clear.	Clear.	Clear.	Fair.	Clear.	Clear.	Clear
RAINFALL IN TWENTY-FOUR HOURS.						
Totals rain during the season, from July 1, 1877, 34.05 in.						

WOODWARD'S GARDENS has the following new attractions: The buffalo chase; large whale skeleton; new museum; improvements in the zoological department, besides the other features which have made it popular.

For the Paris Exposition.

The Committee on Minerals for the Paris Exposition announce that everything not in by the first of April will be left behind. It is likely that many mineral specimens intended for the great show will not reach here by that time, and as there are probably other things yet to be sent forward, it may be worth while to state that the American European Express, Baldwin Bros. & Co., Proprietors, 72 Broadway, New York, forward packages to the Paris Exposition at the following special rates: Four lbs. \$1.25; 8 lbs. \$1.50; 12 lbs. \$2.25; 20 lbs. \$3.25; 50 lbs. \$4.25; 75 lbs. \$5.10; 100 lbs. \$5.50, and for everything over three feet, 95 cents per foot. Custom expenses at Havre, 60 cents additional, per package. Freight in all cases to be prepaid.

Mr. W. J. WOOLLEY, who took out a Canadian Patent some four years ago, is requested to call at the MINING AND SCIENTIFIC PRESS PATENT AGENCY OFFICE. Business of importance.

ANY PHOTOGRAPHER having a large Camera Box for sale will please notify "N. S." at this office.

MODEL-MAKER AND MACHINIST.—J. A. Heald, No. 514 Commercial St., San Francisco, (fourth floor).

METALS.

[WHOLESALE.]

WEDNESDAY, M., April 10, 1878.

IRON.—			
American Pig, ton.	23 00	23 00	00
Scotch Pig, ton.	23 00	23 00	00
White Pig, ton.	23 00	23 00	00
Oregon Pig, ton.	23 00	23 00	00
Refined Bar.	21 00	21 00	34
Horse Shoes, keg.	5 00	5 00	00
Nail Rod.	—	—	74
Norway, Oval.	—	—	74
COPPER.—			
Sheathing, lb.	34 00	34 00	35
Sheathing, Yellow.	21 00	21 00	00
Sheathing, Old Yellow.	12 00	12 00	00
Composition Nails.	24 00	24 00	00
Composition Bolts.	24 00	24 00	00
STEEL.—			
English Cast, lb.	13 00	13 00	14
Anderson & Woods, ordinary sizes.	15 00	15 00	00
Drill.	15 00	15 00	00
Flat Bar.	14 00	14 00	19
Plow Steel.	8 00	8 00	123
TIN PLATES.—			
10x14 1/2 Charcoal.	7 50	8 50	00
Bacon Tin.	23 00	23 00	24
Australian.	17 00	17 00	173
ZINC.—			
By the Cask.	9 00	9 00	00
Zinc Sheet 7x3 ft. 7 to 10, lb.	9 00	9 00	10
7x3 ft. 11 to 14.	10 00	10 00	00
8x4 ft. 8 to 10.	11 00	11 00	00
8x4 ft. 11 to 10.	11 00	11 00	00
NAILS.—			
Assorted sizes.	3 15	3 15	25
QUICKSILVER.			
By the lb.	43 00	43 00	45

LEATHER.

[WHOLESALE.]

WEDNESDAY M., April 10, 1878.

Sole Leather, heavy, lb.		26 00	29
Light.		22 00	24
For Linings.		40 00	40
11 to 13 Kil.		65 00	00
14 to 19 Kil.		80 00	00
Second Choice, 11 to 15 Kil.		65 00	00
Cornellian, 12 to 15 Kil.		57 00	00
Females, 12 to 15 Kil.		63 00	00
14 to 16 Kil.		71 00	00
Simon Ulmo, Females, 12 to 15 Kil.		58 00	00
14 to 15 Kil.		66 00	00
16 to 17 Kil.		70 00	00
Simon, 18 Kil.		73 00	00
20 Kil.		81 00	00
24 Kil.		72 00	00
Robert Calf, 7 and 9 Kil.		35 00	00
Kids French, lb.		1 00	1 35
Cal. doz.		3 00	38
French Sheep, all colors.		8 00	15 00
Eastern Calf for Backs, lb.		1 00	1 25
Sheep Roans for Tapping, all colors, doz.		9 00	13 00
Cal. Russet Sheep Linings.		5 50	10 50
Boots Legs, French Calf, pair.		4 00	4 50
Good French Calf.		4 00	4 75
Best Jodot Calf.		5 00	5 25
Leather, Harness, lb.		35 00	38
Fair Bridle, doz.		48 00	00
Skirting, lb.		33 00	37
Welt, doz.		30 00	50 00
Buff, ft.		18 00	20
Wax Side.		17 00	18

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, April 10, 3 P. M.

LEGAL TENDERS TO S. F., 11 A. M., 99 1/2. SILVER, 1.80 @ 2.12. GOLD IN NEW YORK, 100 1/2.

GOLD BARS, 800 @ 310. SILVER BARS, 8 @ 15 1/2 cent. discount.

EXCHANGE IN NEW YORK, 1/2; on London bankers, 49 1/2 @ 49 3/4. Commercial, 50; Paris, five francs 1/2 dollar; Mexican dollars, 85.

LONDON Consols 94 1/2; Bonds, 105 1/2.

QUICKSILVER IN S. F., by the flask, 1/2 lb., 46 @ 47 1/2.

R. HOE & CO.'S CHISEL TOOTH MILL EDGER,

And Shop Circular Saws with Recent Improvements, Made especially to meet the requirements of the heavy work of this Coast, are now giving perfect satisfaction in the many mills in which they are in use.

A SIXTY DAYS' TRIAL,

Which we allow responsible parties, will convince them that they cannot too soon avail themselves of the advantages of a saw that is in perfect condition to run when they receive it, and always remains sharp, exactly round, and precisely the same to a hair in every respect, without any of the expensive skilled labor which other saws constantly demand. Both Filers and Files are dispensed with.

The teeth being always the same length, and the cutting angle always the same, they never dodge, but go through the knots in a surprising manner.

They never have to be taken off the mandrel, and will stand up square in edging and stock, which makes them indispensable for gangs.

The advantages being too numerous to mention in an advertisement, parties will please send for circulars and say they saw this in Mining and Scientific Press.

H. L. TATUM & Co., Sole Agents, No. 51 Fremont Street, San Francisco.

Also, agents for the ALBANY LUBRICATING COMPOUND AND CURS, the only reliable method of lubricating machinery, doing it almost without attention, absolutely without dirt or stop, and at a merely nominal expense, and for the WORLD STANDARD CYLINDER OIL, OF SAME MAKE.

THE Sarpint of Siskiyou County; Or DIAMOND DICK,

A POWERFUL AND THRILLING ROMANCE OF ARIZONA,

BY DELTA CALAYARRAS.

Just commenced and now ready in No. 21 of the

NEW YORK WEEKLY.

FOR SALE BY ALL NEWS AGENTS.

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

MUST be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where he principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Cataract and Wide West Hydraulic Gravel

Mining Company. Location of principal place of business, San Francisco, Cal. Location of works, Elgin Mining District, Calaveras County, Cal.

Notice.—There are delinquent upon the following described stock, on account of assessment No. 1, levied on the fifth day of March, 1878, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Philan, Joseph P.	5	125	\$18 75
Philan, Joseph P.	6	125	18 75
Keefe, Windsor A., trustee.	8	500	75 00
Keefe, Windsor A., trustee.	9	500	75 00
Keefe, Windsor A., trustee.	10	500	75 00
Keefe, Windsor A., trustee.	11	500	75 00
Keefe, Windsor A., trustee.	12	500	75 00
Keefe, Windsor A., trustee.	13	500	75 00
Keefe, Windsor A., trustee.	14	500	75 00
Keefe, Windsor A., trustee.	15	500	75 00
Keefe, Windsor A., trustee.	16	500	75 00
Keefe, Windsor A., trustee.	17	500	75 00
Keefe, Windsor A., trustee.	18	500	75 00
Keefe, Windsor A., trustee.	19	100	15 00
Keefe, Windsor A., trustee.	20	100	15 00
Keefe, Windsor A., trustee.	21	100	15 00
Keefe, Windsor A., trustee.	22	100	15 00
Keefe, Windsor A., trustee.	23	100	15 00
Keefe, Windsor A., trustee.	24	100	15 00
Keefe, Windsor A., trustee.	25	100	15 00
Keefe, Windsor A., trustee.	26	100	15 00
Keefe, Windsor A., trustee.	27	100	15 00
Keefe, Windsor A., trustee.	28	100	15 00
Keefe, Windsor A., trustee.	29	100	15 00
Keefe, Windsor A., trustee.	30	100	15 00
Keefe, Windsor A., trustee.	31	100	15 00
Keefe, Windsor A., trustee.	32	100	15 00
Keefe, Windsor A., trustee.	33	100	15 00
Keefe, Windsor A., trustee.	34	100	15 00
Keefe, Windsor A., trustee.	35	100	15 00
Keefe, Windsor A., trustee.	36	100	15 00
Keefe, Windsor A., trustee.	37	100	15 00
Keefe, Windsor A., trustee.	38	100	15 00
Keefe, Windsor A., trustee.	39	100	15 00
Keefe, Windsor A., trustee.	40	100	15 00
Keefe, Windsor A., trustee.	41	100	15 00
Keefe, Windsor A., trustee.	42	100	15 00
Keefe, Windsor A., trustee.	43	100	15 00
Keefe, Windsor A., trustee.	44	100	15 00
Keefe, Windsor A., trustee.	45	100	15 00
Keefe, Windsor A., trustee.	46	100	15 00
Keefe, Windsor A., trustee.	47	100	15 00
Keefe, Windsor A., trustee.	48	100	15 00
Keefe, Windsor A., trustee.	141	100	15 00
Keefe, Windsor A., trustee.	142	100	15 00
Keefe, Windsor A., trustee.	143	100	15 00
Keefe, Windsor A., trustee.	144	100	15 00
Keefe, Windsor A., trustee.	145	100	15 00
Keefe, Windsor A., trustee.	146	100	15 00
Keefe, Windsor A., trustee.	147	100	15 00
Keefe, Windsor A., trustee.	148	100	15 00
Keefe, Windsor A., trustee.	149	100	15 00
Keefe, Windsor A., trustee.	150	100	15 00
Keefe, Windsor A., trustee.	151	100	15 00
Keefe, Windsor A., trustee.	152	100	15 00
Keefe, Windsor A., trustee.	153	100	15 00
Keefe, Windsor A., trustee.	154	100	15 00
Keefe, Windsor A., trustee.	155	100	15 00
Keefe, Windsor A., trustee.	156	100	15 00
Keefe, Windsor A., trustee.	157	100	15 00
Keefe, Windsor A., trustee.	158	100	15 00
Keefe, Windsor A., trustee.	159	100	15 00
Keefe, Windsor A., trustee.	160	100	15 00
Keefe, Windsor A., trustee.	161	100	15 00
Keefe, Windsor A., trustee.	162	100	15 00
Keefe, Windsor A., trustee.	163	10	1 50
Keefe, Windsor A., trustee.	164	10	1 50
Keefe, Windsor A., trustee.	165	10	1 50
Keefe, Windsor A., trustee.	166	10	1 50
Keefe, Windsor A., trustee.	167	10	1 50
Keefe, Windsor A., trustee.	168	10	1 50
Keefe, Windsor A., trustee.	169	10	1 50
Keefe, Windsor A., trustee.	170	10	1 50
Keefe, Windsor A., trustee.	171	10	1 50
Keefe, Windsor A., trustee.	172	10	1 50
Keefe, Windsor A., trustee.	173	10	1 50
Keefe, Windsor A., trustee.	174	10	1 50
Keefe, Windsor A., trustee.	175	10	1 50
Keefe, Windsor A., trustee.	176	10	1 50
Keefe, Windsor A., trustee.	177	10	1 50
Keefe, Windsor A., trustee.	178	10	1 50
Keefe, Windsor A., trustee.	179	10	1 50
Keefe, Windsor A., trustee.	180	10	1 50
Keefe, Windsor A., trustee.	181	10	1 50
Keefe, Windsor A., trustee.	182	10	1 50
Keefe, Windsor A., trustee.	183	10	1 50
Keefe, Windsor A., trustee.	184	10	1 50
Keefe, Windsor A., trustee.	185	10	1 50
Keefe, Windsor A., trustee.	186	10	1 50
Keefe, Windsor A., trustee.	187	10	1 50
Keefe, Windsor A., trustee.	188	10	1 50
Keefe, Windsor A., trustee.	189	10	1 50
Keefe, Windsor A., trustee.	190	10	1 50
Keefe, Windsor A., trustee.	191	10	1 50
Keefe, Windsor A., trustee.	192	10	1 50
Keefe, Windsor A., trustee.	193	10	1 50
Keefe, Windsor A., trustee.	194	10	1 50
Keefe, Windsor A., trustee.	195	10	1 50
Keefe, Windsor A., trustee.	196	10	1 50
Keefe, Windsor A., trustee.	197	10	1 50
Keefe, Windsor A., trustee.	198	10	1 50
Keefe, Windsor A., trustee.	199	10	1 50
Keefe, Windsor A., trustee.	200	10	1 50
Keefe, Windsor A., trustee.	201	10	1 50
Keefe, Windsor A., trustee.	202	10	1 50
Keefe, Windsor A., trustee.	203	10	1 50
Keefe, Windsor A., trustee.	204	10	1 50
Keefe, Windsor A., trustee.	205	10	1 50
Keefe, Windsor A., trustee.	206	10	1 50
Keefe, Windsor A., trustee.	207	10	1 50
Keefe, Windsor A., trustee.	208	10	1 50

Names.

Williams, Samuel F.	1556	100	100 00
Williams, Samuel F.	1557	100	100 00
Williams, Samuel F.	1558	100	100 00
Williams, Samuel F.	1559	100	100 00
Williams, Samuel F.	1560	100	100 00
Williams, Samuel F.	A130	80	80 00
Whebronga, Mrs Sarah D.	unissued	135	135 00
Wright, Augustus	unissued	270	270 00
Wright, W. H.	unissued	214	214 00
Wright & Co, Thos.	unissued	100	100 00
Wright, Augustus E.	unissued	300	300 00

No. Certificate. No. Shares. Amount.

And in accordance with law and an order of the Board of Directors, made on the seventh day of January, 1878, many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Company, Room 31, Nevada Block, No. 309 Montgomery Street, San Francisco, California, on Monday, the twelfth day of March, 1878, at the hour of one o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of the sale.

LEANDER LEAVITT, Sec'y.

Office, Room 31, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

POSTPONEMENT.—The sale day for delinquent stock of the above assessment is hereby postponed until Monday, April first, 1878, at the same hour and place.

LEANDER LEAVITT, Sec'y.

POSTPONEMENT.—The sale day for delinquent stock of the above assessment is hereby postponed until Monday, April twenty-ninth, 1878, at the same hour and place.

LEANDER LEAVITT, Sec'y.

Summit Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Mineral Point Mining District, Plumas County, California.

Noticed hereby given, that at a meeting of the Board of Directors, held on the twenty-first day of March, A. D., 1878, an assessment (No. 2.) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of said Company, Room 6, No. 318 Pine Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the first day of May, A. D., 1878, will be delinquent, and, if not paid for sale at public auction, and unless payment is made before, will be sold on the twenty-eighth day of May, A. D., 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Directors.

J. W. CLARK, Sec'y.

Office, Room 6, No. 318 Pine Street, San Francisco, Cal.

The Welch Consolidated Quicksilver Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Mount Diablo, Contra Costa County, Cal.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1.) levied on the fourteenth day of February, 1878, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Corbett, A. C., trustee.	5	100	\$ 10 00
Hearst, George, trustee.	4	100	10 00
Forbes, A. P., trustee.	25	1500	150 00
Forbes, A. P., trustee.	28	000	90 00
Forbes, A. P., trustee.	29	1500	150 00
Phillips, S., trustee.	15	5000	500 00
Phillips, S., trustee.	16	3000	300 00
Phillips, S., trustee.	17	1000	100 00
Phillips, S., trustee.	18	6000	600 00
Phillips, S., trustee.	19	100	10 00
Phillips, S., trustee.	21	100	10 00
Phillips, S., trustee.	24	100	10 00
Phillips, S., trustee.	33	30000	3000 00
Phillips, S., trustee.	34	10000	1000 00
Ryan, E. J., trustee.	3	40000	4000 00
Ryan, E. J., trustee.	12	500	50 00
Ryan, E. J., trustee.	13	100	10 00
Ryan, E. J., trustee.	23	100	10 00
Ryan, E. J., trustee.	27	4100	410 00
Ryan, Mrs Sarah V., trustee.	11	1000	100 00

And in accordance with law and an order of the Board of Directors, made on the fourteenth day of February, 1878, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Company, Room 7, No. 420 Montgomery Street, San Francisco, California, on Tuesday, the sixteenth day of April, 1878, at the hour of 12 o'clock M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. P. FORBES, Sec'y.

Office, Room 7, No. 420 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

Office of Consolidated Virginia Mining Company, San Francisco, April 6th, 1878.—At a meeting of the Board of Trustees of the above named Company, held this day, a dividend (No. 4.) of two (2) dollars per share was declared payable on Saturday, 13th instant. Transfer books closed until 15th instant.

A. W. HAYES, Secretary.

SWEET

Chewing

NAVY

Tobacco

Awarded highest price at Centennial Exposition for fine chewing qualities and excellence and lasting character of smoking and flavoring. The best tobacco ever made. As our blue strip trade-mark is closely imitated on inferior goods, see that Jackson's Best is on every plug. Sold by all dealers. Send for sample free to C. A. JACOB & Co., Mfrs., Petersburg, Va.

L. & E. WERTHEIMER, Ag'ts, San Francisco.

Dewey & Co. { 202 Sansome St. } Patent Ag'ts.

WATER WHEEL.

Horizontal Flumes,
Espe-
W,
ing Goods.

Horizontal Flume, Pat. April 1st, 1873.

Wheel Receiving Three First-class
at the Centennial.

OTHERS ARE FRAUDULENT, AND WILL BE DEALT
MYERS, General Agent for Pacific Coast.
6, San Francisco, Cal.

to in the Post-office, and I will find you

Iron and Machine Works.

THOS. PENDERGAST.

HENRY S. SMITH.

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MANUFACTURERS OF

IRON CASTINGS**and MACHINERY**

OF ALL KINDS.

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SAN FRANCISCO.

**PHELPS
MANUFACTURING COMPANY,**

Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

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SAN FRANCISCO, CAL.**SACRAMENTO BOILER WORKS,**

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HALL & KELSHAW,

PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the lowest possible terms.

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Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

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MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills' Machinery constructed, fitted up and repaired.

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SACRAMENTO, CAL.**CALIFORNIA BRASS FOUNDRY,**No. 125 First Street, Opposite Minna,
SAN FRANCISCO, CAL.All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.
J. H. WEED. V. KINGWELL.**California Machine Works,**

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BIRCH, ARGALL & CO.,BUILDERS OF QUARTZ, SAW AND FLOUR MILLS,
STEAM AND HYDRAULIC ELEVATORS.

Sole manufacturers of Brodie's Patent Rock Crushers and Steel Faced Tappets, and General Machinists.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

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THORNTON THOMPSON.

THOMPSON BROTHERS,
EUREKA FOUNDRY,
129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

A JOB PRESS WANTED.

Any printer having an Eighth or Quarter Medium Job Press for sale, will please address J. P., care of Dewey & Co., S. F. State condition and lowest price.

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MACHINE WORKS,**

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Manufacturers of

IMPROVED PORTABLE**Hoisting Engines,**

For Mining and Other Purposes.

Steam Engines and all Kinds of Mill and Mining Machinery.

Pacific Rolling Mill Co.,

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MANUFACTURERS OF

RAILROAD AND MERCHANT IRON,

ROLLED BEAMS, ANGLE, CHANNEL AND T IRON, BRIDGE AND MACHINE BOLTS, LAG SCREWS, NUTS, WASHERS, ETC., STEAMBOAT SHAFTS, CRANKS, PISTONS, CONNECTING RODS, ETC., ETC.

Car and Locomotive Axles and Frames, and Hammered Iron of Every Description.

HIGHEST PRICE PAID FOR SCRAP IRON.

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MANUFACTURERS OF

Marine Engines and Boilers,

Propeller Engines either High Pressure or Compound Stern or Side Wheel Engines.

Mining Machinery.

Hoisting Engines and Works, Cages, Ore Buckets, Ore Cars, Pumping Engines and Pumps, Water Buckets, Pump Columns, Air Compressors, Air Receivers, Air Pipes.

Mill Machinery.

Batteries for Dry or Wet Crushing, Amalgamating

Engines and Boilers of all kinds, either for use on Steamboats and made in accordance with the Act of Congress regulating the same, or for use on land. Water Pipe, Pump or Air Column, Fish Tanks for Salmon Canneries of every description. Boiler repairs promptly attended and at very moderate rates.

PACIFIC IRON WORKS,

First and Fremont Streets, between Mission and Howard, San Francisco, Cal.,

RANKIN, BRAYTON & CO.,

MANUFACTURERS OF

ENGINES, BOILERS, MARINE AND STATIONARY. PUMPING, HOISTING AND MINING MACHINERY INCLUDING BATTERIES, AMALGAMATING PANS AND SETTLERS, CONCENTRATORS, ORE FEEDERS, CRUSHING ROLLS AND ROCK BREAKERS. ALSO, WATER JACKET SMELTING FURNACES, FOR REDUCING LEAD, SILVER AND COPPER ORES, QUICKSILVER FURNACES, RETORTS AND CONDENSERS, ROASTING AND CHLORIDIZING FURNACES, SUGAR MILL MACHINERY, WATER WHEELS, ETC., ALL OF THE LATEST AND MOST IMPROVED CONSTRUCTION.

Agents for the Allen Engine Governor, Cooke's Boiler Feeder and Heater, Buckminster Rock Drills and Air Compressors, Wheeler's Ore Breaker, Etc.

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It breaks more ground, pulverizes it better, saves time and money, and is superseding the ordinary powder wherever it is tried. Triple Force Caps and all Grades of Fuse.

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Experimental and Fine Special Machinery, Planing and Gear Cutting, Printing Press, Band Instrument and General Machine Repairing; Dies, Taps, Punches, Reamers and other Tools made to order. Models and Patterns for Inventors promptly executed in Wood or Metals. 514 Commercial Street, between Sansome and Leidesdorff, (Third Floor), San Francisco, Cal.

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WIND MILL. One of the best made in this State for sale cheap on easy terms. Address, W. T., care of Dewey & Co., S. F.**San Francisco Pioneer Screen Works,**

J. W. QUICK, MANUFACTURER,

Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.
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FOR SALE.—A Good Type-Writer. Price, \$50 For further information, address "COPYIST," this office.

50 BEST Mixed Cards, with names, in case, 13c, or 25 no two alike, 10c. Outfit, 10c. Bowd & Co., Bristol, Ct.

Metallurgy and Ores.**E. K. STEVENOT & CO.'S**

BORAX AND METALLURGICAL REFINERY,

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Refiners of Borax, Alum, Nitrate of Soda, Saltpeter, Potash, Etc.
Sampling, Assaying or Analyzing of Minerals, small lots of ores bought or worked by any process.
Old Copper Plates bought or worked up. Deposits of Bullion run into bars.

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Nevada Metallurgical Works,

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Ores worked by any process.

Ores sampled.

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We would call the special attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our stock of Clay Crucibles, Muffles, Dry Cups, etc., manufactured by the Patent Plumbago Crucible Co., of London, England, for which we have been made Sole Agents for the Pacific Coast. Circulars with prices will be sent upon application. Also, to our large and well adapted stock of

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Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast.

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GUIDO KUSTEL,

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Machinery.

The Ingersoll Rock Drill

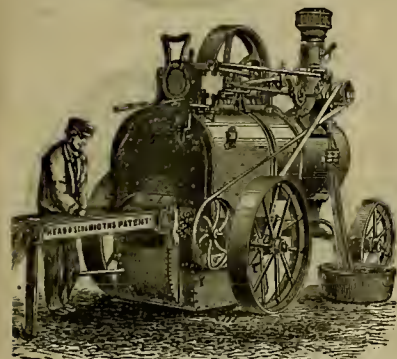


Mines Using these Drills on the Comstock Lode—Virginia City, Nevada:

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California M. Co.,	Crown Point M. Co.,
C. & O. Shaft,	Belcher M. Co.,
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Overman M. Co.,	Baltimore Con. M. Co.,
Hullon M. Co.,	Silver Hill M. Co.,
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J. B. REYNOLDS,
327 Market Street.

STEAM ENGINES AND BOILERS.



One new Straw-burning Portable Engine, made by Ransome, Sims & Head, Ipswich, England. This is a very superior engine, sent here as a sample engine for exhibition; one second-hand Straw-burning Engine, 8x10 inch cylinder, (Rice); one second-hand Wood-burning Engine, 8x12 inch cylinder, (Hoadley); one second-hand Wood-burning Engine, 7x10 inch cylinder, (Hoadley); one second-hand Wood-burning Engine, 6x10 inch cylinder, (Hoadley); one second-hand Wood-burning Engine, 6x12 inch cylinder, side engine; one new Stationary Engine, independent cut-off, 12x24 inch cylinder. [The Straw-burning Engines named are free from infringements.]

One large sized Rock Breaker, Varney & Rix, size 9x15; one Wood Splitting Machine; one 36-inch cylinder Russel Separator, (with extra cylinder, and Lauffenberg shoe—very cheap, on account of owner's death; (will be sold with or without any of above engines.) All of the above second-hand engines have been in shop and overhauled, and are in good working order. Various other machinery for sale. Purchase made on Commission. Machinery repairs solicited. Specialty of Portable Engines and Boilers for threshing.

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THE O'HARRA CHLORIDIZING FURNACE.

This furnace is guaranteed to chloridize from 88 per cent. to 95 per cent. of the silver, and put gold in a state so that 88 to 95 per cent. of the battery assay can be obtained by amalgamation on any gold or silver ore ever formed by nature.

The cost of Roasting and Chloridizing is as follows:
One man, per day.....\$ 3 50
One man, per day.....\$ 3 00
Wood, 14 cords at \$3.....7 00

Cost of 20 tons.....\$13 50
Cost of one ton..... 67 1/2

From 2 1/2 to 5 per cent. of salt is necessary.

In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

Several furnaces are in successful operation in California, Nevada and Idaho.

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LEWIS CHALMERS, Manager Exchequer and IXL Mines, Silver Mountain, Cal.

J. S. CONE, Vice-President Tehama County Bank, Red Bluff, Cal.

R. H. CAMPBELL, Superintendent Afterthought Mine, Redding, Shasta County, Cal.

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D. J. O'HARRA, Reno, Nevada.

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Rock Drills, Air Compressors—Burleigh's.

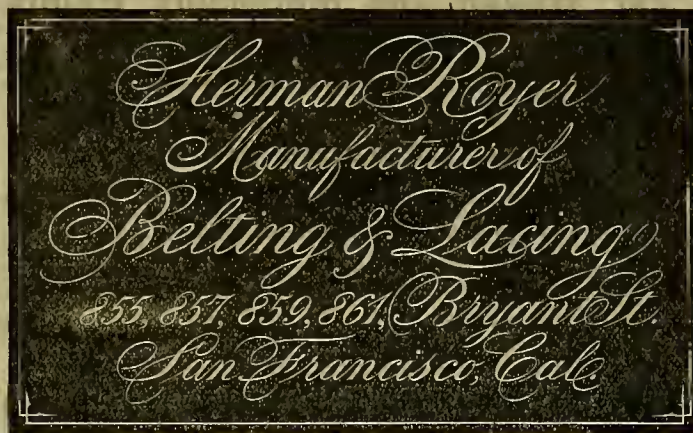
Machinists' Tools—Putnam's. Compound Steam Pumps—Walker's. Plunger Pumps—Cope & Maxwell. Bucket Plunge Pumps—Valley Machine Co. Centrifugal Pumps—Heald & Cisco's. Vertical Steam Engines, Hoisting Engines—Haskin's. Chemical Engines, Hook and Ladder Trucks, Fire Extinguishers—Babcock & Champion. Farmer's Electro Battery. Hill's Exploders. Slow's Flexible Shaft.

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A first-class, large sized Britton Fire Engine, in fair order is offered for sale cheap. Price, \$400. It is worth more than double that sum. About forty men can work on the brakes. Towns or corporations wishing a good machine should examine this engine before ordering elsewhere. Apply to

ROOT, NELSON & CO.,

Union Foundry,

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THE ONLY ABSOLUTELY SAFE OILER.

NEAT AND SAVES TIME AND OIL.
Oiling Tube made any desired length.
Capacity of Can, six gills.

By the simple pressure on the valve, the oil is delivered in the exact quantity desired, (from one drop to a spoonful) exactly on the bearing, with no possibility of clogging. In ordinary factories the saving will pay for the oil in 60 days. Send for Circular.

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FIVE SIZES.

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Established 1844.

JOSEPH C. TODD,
(Formerly of TODD & RAFFERTY.)

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—AND—
MACHINIST.

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Among the advantages gained by this holder are the following:
It can be opened and closed quicky.

The points are less obstructed while the articles to be filed are being placed.

The papers (wholly or partly folded) can be either "straddled" over the lower bar, or filed in regular book order.

The elastic hinge and hand accommodate and hold firm either a large or small number of papers.

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It has proved durable in practice. The file is adjusted but 52 times a year for a weekly paper, and a sample holder can be opened and closed 1,000 times without showing wear.

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Tip-top Dinners, 50 Cents,

Are given from 5 to 8 o'clock P. M. It will pay yourself and friends, too, to go considerably out of your way to visit and patronize this first-class restaurant.

ERNEST SCHNUTENHAUS,
J. M. WEBSTER,
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Smelter and Refiner.

A competent person is desirous of receiving the position of Superintendent of a Smelting and Refining Works. Can give satisfactory reference for ability to smelt all lead ores, refine silver and make market lead. No objections to go to the Territories. Address P. F. M., this office.

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For a small amount, in several claims on one of the RICHEST LEDGES IN ARIZONA. Money needed for development. The ore will pay a hand some margin to ship to the city. Apply at this office.

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411 Bush Street, above Kearny, SAN FRANCISCO
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Prepared Ready for Use, is the Best, Most Durable, Beautiful and Economical Paint Known.

As is proven by the numerous Medals received over all other Paints, as well as by thousands of testimonials from those who have used and thoroughly tested it.

It is of Pure White and any Shade or Color Desired.



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It is the most perfect substance known, possessing unsurpassed beauty, great brilliancy of color, adhering firmly to the wood, and giving the richest, most agreeable and uniform tints.

It is equally as good for inside as outside work; over old work as well as new; in fact where any Paint can be used the AVERILL PAINT will be found superior to any other.

Houses painted with it are distinguishable for years by their superior brilliancy of finish, over those painted with any other paint.

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From the finest Vermilion, to the more common and cheaper colors, are specially fine, and being ready mixed, meet the wants of the public completely. Every person owning a wagon, or any kind of machinery, should occasionally give them a fresh coat of paint. It would add to the durability and appearance of the articles a hundred times its cost.

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Comes the nearest to being actually Fire Proof of any Paint ever made. For Tin Roofs it has no equal, it being entirely impervious to air or moisture—rust or corrosion is impossible, while its use on shingle roofs not only fills up the cracks and prevents the shingles from warping, so as to preserve the roof and prevent its leaking, but its fire proof qualities are such, that a roof thoroughly coated with it is nearly as safe from fire as if made of iron. This feature, together with its cheapness, makes it most desirable for warehouses, bridges, mining buildings, and for all purposes where durability and fire proof qualities are desired.

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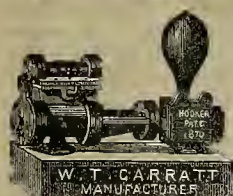
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MANUFACTURER AND IMPORTER OF
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BRASS CASTINGS of all kinds,
WATER GATES, GAS GATES,
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A General Assortment of Engineers' Findings.



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STEAM PUMP

The Best and Most
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For Mining and Farm-
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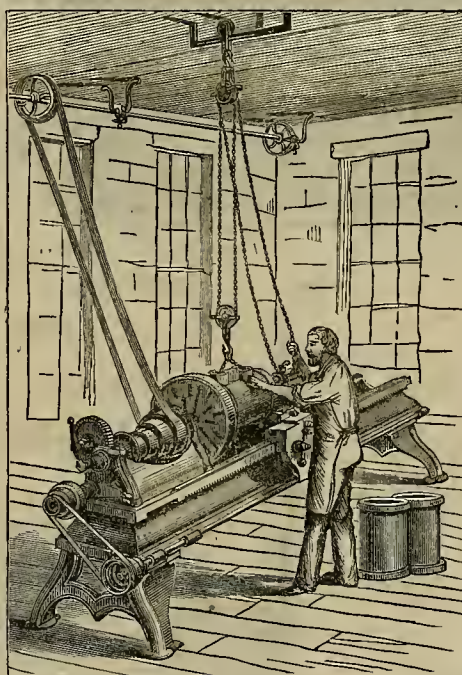
WORK AND COMPOSITION NAILS,
AT LOWEST RATES.

N. W. SPAULDING'S



PATENT DETACHABLE TOOTH SAWS,
Manufactory, 17 & 19 Fremont St., S. F.

WESTON'S DIFFERENTIAL PULLEY BLOCKS.



One Man Can Easily Lift
1,000 Pounds.

Load Always Suspended; it
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Lowering Effected by Pulling
the Slack Chain.

One Man With This Tackle
is Better than Four or
Five with the Ordina-
ry Double Block.

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TO MACHINE SHOP USE.

This Labor-Saving Pulley is of daily value
in Machine Shops and Factories. The Me-
chanic is enabled

WITHOUT ASSISTANCE,

To safely adjust with accuracy large and
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their position by means of a traveler. In fact,
the Pulley supplies a want in machine shops
which nothing else entirely fills.

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Sizes From 1/4 Inch to 6 Inches.

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fittings for Gas, Steam and Water.

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MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, APRIL 20, 1878.

VOLUME XXXVI.
Number 16.

Foundry Notes.

The work being done at our foundries continues to be largely of a miscellaneous kind, few being employed on extensive contracts, or machinery of an extra heavy description. At the Fulton, they are building two sets of powerful compound engines, one for Whitelaw's new steamer, designed for the Eel river trade, and the other for another sea-going steamer, for which they are also constructing a boiler of large dimensions. Besides these they have on hand at this establishment the following work: A new style of hydraulic dredger, which, while well suited for all work of this kind, is especially adapted to raising sand, gravel and shingle from the bottom of rivers, being designed for operations on the streams in the gold regions of this and adjacent States. To go with these dredges, of which several are being constructed, engines and boilers are also being built. These machines operate by suction, the exhaust pipe of the larger being 30 inches in diameter, admitting of their taking up pretty good sized boulders when required. They are also making here a large lot of pipe for the Oroville city water works; a fire box for a new steamer; two engines and boilers, one for the Endowment mining company, and another for the Washington brewery, in Oakland, and a boiler with other work for the "Extra" mining company. They have now 14 boilers in hand, several of large dimensions. They employ here at the present time a working force of 175 hands, a fair proportion of them being apprentices. We find on inquiry among the foundrymen that, however it may be with other trades, journeymen here never object to taking as many apprentices as they see fit; the workmen, in fact, never interfering with such matters one way or the other. They have at the Fulton between 20 and 30 young men and boys all the time.

At the Columbia and such other foundries, as are mainly engaged in turning out house and general building work, very little is being done owing to the depressed condition of this branch of improvement. At the Etta foundry they have just shipped to Guymas a five-stamp mill, and one of the Bruckner furnaces, the latter for the Baranca mining company, both being designed for mining companies in the interior of Sonora. This machinery was built and shipped in sections convenient for packing on mules. They are building here the Wood & Coagdon pulverizer and the Whits furnace and drier, for all of which they receive a good many orders. This pulverizer consists of a cylinder inside of which the ore is placed and crushed by its own attrition to such a degree of fineness that it passes through the narrow spaces between the steel bars that surround the cylinder. It is a dry crusher, and so far as tested seems to do its work cheaply and well. In so far as the manufacture of mining and most kinds of miscellaneous machinery are concerned, our foundrymen anticipate a good season, notwithstanding the dullness thus far, which it is understood has been largely due to the inclemency of the weather. For the class of work required for building purposes it is expected orders will be restricted, there being not much demand for additional houses in the city at present.

UNDOUBTED authority places the weekly gold shipment from the Black Hills at \$75,000.

A Steel Ship.

An interesting and important trial of a new steel vessel, the first built on the Tyne, or elsewhere, for ordinary sea-going purposes, took place last month. The vessel is called the *Ethel*, and was built for the Spanish ore trade by Mitchell & Co., iron shipbuilders. She is, as already stated, the first vessel of the kind yet constructed, and the idea of her formation is due to the wisdom and foresight of Mr. H. Clapham, the senior member of the firm, who has been the first to perceive and utilize the superior value of steel over iron for shipbuilding purposes. The principal advantage of adopting steel is the saving in the weight of the hull; and in this instance Lloyd's have allowed a reduction of about 20% on the usual weight of iron, which makes a difference of 73 tons. Iron, from which we glean the particulars, says the length of the vessel is 210 feet between perpendiculars and 216 feet over all; she is 30 feet beam and 17 feet three inches depth molded, or about 16 3-16ths feet depth of hold. She is

are greater steadiness of the compass at sea in all weathers and in every class of ship; to reduce the fractional error to as small an amount as to cause no inaccuracy or inconvenience; to obtain greater security in the use of the compass in iron ships; and to diminish the expenses and annul the detentions at present required for adjusting compasses in iron ships. The sounding machine is designed for ascertaining accurately and quickly the depth of water under a ship, without stopping or even reducing her speed, and in test proved accurate to half a fathom in 19.

During the trial steam was maintained at 70, the engines ran at from 70 to 80 revolutions, and the mean speed was 9 1/2 knots. Mr. Swan said that as to the creation of this ship it was due entirely to Mr. Clapham himself. So far as could be seen, the number of steel vessels would gradually increase, so that after the lapse of a few years an iron vessel would be the exception and not the rule. One great advantage attending steel ships was that the cost per ton carrying was not much more than for an iron vessel, so that the owner would only pay the same tonnage dues—say, 700 or 800 tons, or whatever it might be, notwithstanding that

The Winchester Repeating Rifle.

The Winchester rifle is too well known to the public to require any detailed description at our hands, but we give illustrations herewith of the new models of 1876 of this arm. This success attending the sale and use of Model 1873 and the constant calls from many sources, and particularly from the regions in which the grizzly bear and other large game are found, as well as from the plains where the absence of cover and the shyness of the game require the hunter to make his shots at long range, made it desirable for the company to build a still more powerful gun. Retaining all the essential mechanical elements of the former model, and adding such improvements as seemed possible, the result has been a gun carrying a central fire cartridge, capable of reloading, caliber 45-100, with 75 grains of powder and 350 grains of lead, being nearly double the charge used in the model of 1873, and about the same as that adopted by the U. S. Government.

The materials used in the construction of the gun are the same in kind and quality as in the model of 1873. Both set and plain trigger rifles are made, and all guns with plain trigger are provided with an attachment which renders premature explosion of the cartridge, even from carelessness, absolutely impossible. In both infantry, musket and carbine the magazine is covered by the forearm its entire length. Rifles and carbines are finished in various styles, the Standard arms having blued wrought-iron mountings. The extra finished arms have fancy checkered curled walnut stocks, and case-hardened steel mountings. Some of them are also gold, nickel or silver-plated finish, beautifully engraved. Sporting rifles may be had with pistol grip stocks, Vernier and wind gauge sights, if ordered. For long range target shooting a cartridge is made using 85 to 90 grains of powder and a patched bullet weighing 450 to 500 grains; as these cartridges are necessarily made longer than the regular cartridge, they cannot be used through the magazine, but must be used singly, using through the top of the carrier block mortise. An engraving of this cartridge is herewith given.

A great variety of these Winchester repeating arms may be examined at John Skinner's, 115 Pine street, sole agent for the Pacific coast. The new model shown in the engravings is specially adapted for use on this coast, and meets with great favor.

THE NEW COMBINATION SHAFT.—The Chollar-Norcross-Savage combination shaft is going down about three and one-third feet per day, which, taking into consideration the size of the shaft, is more than the usual rate of progress. It is now down 2,114 feet perpendicularly. The flow of water is now about 23,000 gallons per day. This shaft is now 469 feet below the level of the Sutro tunnel, to which depth it has been sunk without a pump, all the water encountered being hoisted in the sket along with the loose rock.

The North Bloomfield Gravel Mining company shipped \$17,000 worth of gold, the result of two weeks' work.

GENERAL GRANT and family have arrived at Florence, Italy.



guaranteed by the builders to carry 1,300 tons on 14 feet 7 1/2 inches draught of water. The hull of this vessel in iron was estimated to weigh 450 tons; the stem, stern post, head-plate of engines, etc., and engine-room are of iron, and are estimated to weigh 90 tons, which, deducted from the figures above given, leaves the weight of the hull at 360 tons. For this steel has been substituted, and for this Lloyd's have allowed on the average about 20% off the scantling, showing a saving of about 73 tons in weight of the hull. This necessitated the providing of 73 tons extra water ballast, which has been effected by an arrangement in the engine-room. The total water-ballast is 250 tons. The class of this vessel is 95 years A. 1. The engines have been built by the Wallsend Shipway Company. Both ship and boiler are built of Landore Siemens steel. Off the weight of the boiler, Lloyd's have allowed 21% off the outer shell and 10% off the weight of the internal parts. The boiler is fitted with weldless steel tubes, as used in locomotives. At these reductions of thickness, the builders are confident that the vessel is stronger than if built in the ordinary way of iron. This material has shown an extraordinary toughness and also great uniformity of quality. The breaking strain of the plates has been found, after very exhaustive tests, to be as follows: Average elongation, 25.72%; broke at 32 1/2 tons to the square inch.

The cost of the vessel has been about 8% more than if she had been built of iron. Two other novelties introduced into the vessel are Sir W. Thompson's improved sounding machine and Sir W. Thompson's improved mariners' compass. The chief objects aimed at in the latter

her tonnage of carrying capacity was considerably more.

A MINE OF COAL.—During the last year, says the *Nautical Gazette*, the output of coal in the British Islands amounted to 132,000,000 tons. A popular notion is that a great part of the crust of the earth is becoming used up by mining operations, and that if the soil that has been dug out of our mines were piled up it would make quite a mountain range; let us, therefore, reduce this to figures also. A cubic mile is equal to 147,198,000 cubic feet, and allowing 29 1/2 cubic feet, of coal in the solid to weigh a ton, we get just 5,000,000,000 tons of coal in one cubic mile, and this is a greater weight than all that has yet been raised in the British Islands. According to the most reliable statistics, the end of 1878 will just complete the first cubic mile of coal, exclusive of waste in mining. If our fuel had been stored in mountain-heaps on the surface instead of being hurried in the bowels of the earth, a very small mountain range would ensue have been equivalent to all the coal fields available to man in the whole of our earth.

BIG BAR.—The largest gold bar ever cast in Montana was made this month from 30 days' product of the Penobscot mine. It was valued at \$53,258.30 in gold, and \$977.32 in silver. The dimensions are as follows: Length, 20 inches; top breadth, 7 inches; bottom breadth, 6 inches; weight, 3,389 ounces. This came out of the Penobscot in one month, the work of an arrastra and 20 days' work of five stamps.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—E.D.S.

Bodie and Esmeralda.

EDITORS PRESS:—Arrived in Aurora, Nev., two weeks ago to-day, and there remained four days nosing about among the old ruins of Esmeralda, a district which in the history of mining on this coast has made its mark, and then went into decline, but whose future is pregnant with the grandest possibilities. For 14 years Aurora, the chief center of the district, and the seat of government of Esmeralda county, has been given over to a vandalism and neglect seldom if ever seen in any section of country where civilization has even a partial foothold. Fine brick buildings, including several elaborately finished quartz mills with stone trimmings, even polished wood, all demolished, or nearly so; the machinery carted off to other and more inviting fields in this State and Nevada. When one now comes to view the ground in the light of the advancement incident to modern mining over all the Pacific coast, the conclusion is irresistible that old Esmeralda witnessed the perfection of ignorance and rapacity on so important a subject. Last Chance, Middle and Silver hills are crossed by a mineral belt more rich in the croppings of gold and silver, as well as more extensive in length and breadth and definite character than that shown on the original surface of the great Comstock, and the fact of its almost total abandonment for so long a period is simply inexplicable. Two theories are advanced to account for this strange event—the exhaustion of the surface ore bodies in the Ophir and Gould & Curry, and a perfect blaze of litigation over the interests in Esmeralda district, occurring at the same time. At one time Aurora had a population estimated at 16,000, and the evidence pertaining in the shape of ruins seems indisputable. The comparatively few remaining structures are, in view of the reviving prospects, in great demand, though there is no rush of people as yet. Only a few hundred, actual residents and adventurers, constitute the population, for all seems to depend upon the result of the explorations now under way by the new Del Monte syndicate of capitalists and experienced mining men. At present their operations are confined to the single sinking of a deep three compartment shaft, after the style of the modern school, alongside of which the old rootings and scratchings on Last Chance hill are contemptible enough. The products of the old Esmeralda lodeanzas will probably never be accounted for by several millions, but it is safe to say that from twelve to fifteen millions were extracted from depths nowhere exceeding 125 feet.

The immediate cause of the renewal of operations in this connection was the successful development of one of the old mines in Bodie district, Mono county, California—a district whose history has been characterized by even a greater variety of inexperience, if not neglect. The two districts have been twin sufferers—were born, have lived, died, and been resurrected accordingly. Bodie, perhaps, being entitled to a momentary existence in advance of Esmeralda, and a consequent resurrection, if one may be permitted to so express it. The interesting details of the history appertaining would fill a considerable volume, and no attempt will be made in this letter to set them forth. Two weeks of steady note-taking, in connection with an almost continuous and extremely fatiguing exploration on foot, over snow-drifts and through mud, over rocks 10,000 feet above the sea, and climbing ladders, swinging on buckets, and etooping along tunnels underground, has served to render me almost incapable of writing anything beyond a brief generalization. It is hoped that a few days time for reflection will enable your correspondent to describe the resources of Bodie and Esmeralda as indicated by the new dispensation, in a manner acceptable to all classes of readers of the PRESS.

In conclusion, it is safe to say that the outlook of Bodie is encouraging to the end of constituting a large and prosperous mining community for years to come. The lateness of the season when the move in this direction became general has caused more or less inconvenience, some little overdoing of things and consequent confusion and dullness in certain ways. There being but one reliable mill in the district, and that more than occupied by its own mine (the Standard) has served to restrict business and the deep snows have confused the work of exploration to very few leading organizations. The past 10 days of exceedingly agreeable weather, however, have enabled all classes to take a hand in prospecting and mapping out work for the future. It is significant of the confidence exhibited all round, that a town of 200 dwellings has been built in four or five months, with lumber costing \$80 to \$100 per M., and horse-feed in proportion—hay, \$50 to \$100 per ton. The question of human food has been more ample. A great amount of costly and systematic exploration has been in progress since early last fall, and it will be as late as next fall ere Bodie will be in that presentable shape, as a mining district, so desired by those experienced and profoundly interested in the fascinating business. For some weeks prior to the present favorable change of the weather, the town has been plagued with an overplus of incapables, who are so little afraid of work that they can, at all times and under all climes, lie

down and go asleep alongside of it. They are adepts, however, in the exercise of their under jaw, and their complaints and criticisms, to some extent, go out to the world and serve to confuse the public mind as to the real amount of expensive and auspicious labor being performed. Bare ground, good roads and a few months' time will doubtless enable Bodie mining district to speak for itself, outside of the Standard company, without any assistance from—

J. W.

Bodie, Mono Co., April 7th, 1878.

From Our Correspondent in the Black Hills.

EDITORS PRESS:—The placer diggings in the Hills have, since the severe storm, assumed an entirely different appearance, for the weather has suddenly become warm, as if it were stepping with one stride from the depth of winter to the middle of spring, while the snow, which disappeared rapidly, has furnished a liberal supply of water in all the gulches, of which our miners are now taking advantage. Already a stampede has been organized, and a large number of experienced miners have caught that contagious disease—excitement—and have started to prospect a hitherto undeveloped section in the vicinity of the

Bear Lodge Mountains.

About 50 miles northwest of Deadwood. Reports brought in by hunters who wintered in this range, have caused the excitement, the result of which, of course, no one at present can foresee.

In Potato and Bear Gulches.

In a northwesterly direction and about 30 miles from Deadwood, the influx of miners to the placer diggings is reported large during the past two weeks. The mines in these gulches were not thoroughly prospected last year because of the scarcity of water, but the work performed revealed the fact that the ground is very rich, in fact many claims prospected as favorably as in Deadwood, which has always retained the reputation of being the richest gulch in the Black Hills. The gold from the Bear and Potato is of a much coarser grade than most of that found in other sections, and is valued by the hauls at from \$18 to \$19.50 per ounce.

In Nigger Gulch.

Situated near those I have already mentioned, many very rich pockets have already been discovered, and nuggets weighing as heavy as seven ounces have been taken from some of them. The majority of these pockets, so far as discovery has disclosed, contain only nugget gold, the nuggets weighing from a quarter of an ounce to the weight I have before mentioned. It is claimed by those counted on as authority, that these pocket diggings comprise an area six miles long and four wide, the entire extent, so far as has been prospected, being equally as rich as Nigger gulch itself, but this section has at present been so meagerly developed as to render it unsafe for any one to assert positively the extent of the gold-yielding ground there.

So far as concerns

Quartz Mining

In the above mentioned region, none of any consequence has yet been done. A few prospectors have brought in good reports, and show fair specimens; in fact, good enough to warrant the assertion that undoubtedly development will reveal valuable mines, and prove that the gold-bearing quartz and cement in the Hills is not confined to so limited and comparatively small a section of country as was for some time feared, thereby virtually disproving the theory that the mineral-producing region in the Black Hills was too small for consideration by outsiders.

From present indications the

Bear Butte District,

In which valuable silver ore has already been discovered, will this year prove a magnet to a large number of prospectors. At present, however, I can only speak of a few lodes in that district as having been developed to a sufficient extent to warrant any mention of a reliable nature, these being the Florence, Sitting Bull, Yellow Jacket and El Refugio. Some ore from each of these has already been smelted, which has yielded sufficiently well to encourage us all in the belief that further development will prove beyond a doubt that the Black Hills will, at no distant day, compare favorably with Nevada and Colorado as a silver-producing country.

The prospects are very favorable that a number of companies will be incorporated in different sections early this season, with a view to commencing operations in

Hydraulic Mining.

In the False Bottom district a company has already commenced work preparatory to receiving machinery, which I am informed is to be on the ground at an early date. This district is situated about eight miles northwest of this city. The company as originally incorporated control 35 gulch and bar claims, which prospect satisfactorily, and promise rich pay if worked by this process. The hill and bar diggings on Whitewood creek are also to be worked to some extent this season in the same manner. Prospectors assert that these cover an area of about 10 square miles, and will range in depth from 12 to 90 feet, but can be easily and profitably worked by this process because of the excellent facilities for dumping. Five companies, at least, will be incorporated on this creek for this purpose, and will derive the water supply from Boulder ditch, which has a capacity sufficient to supply about seven hydraulic works, being built to carry 1,400 inches of water.

W.M. M. BREWER.

Deadwood, April 5th.

Notes from Nevada County.—No. 2.

[From Our Own Correspondent.]

Taking an early start in quartz and containing within her border much rich placer ground, together with some of the finest gravel deposits of the State, the county may be said to have usually taken the lead in all kinds of mining operations and to have kept apace with the foremost in the introduction of improved machinery as well as the most approved methods for ore reduction.

Compared with other sections, her present condition may be looked upon as healthy and prosperous, although sharing largely of the prevailing dullness in the money market. It may be said, perhaps, that some of her very best paying mines have been closed down, but let it be remembered that others, not less equally rich, have been opened at their side, while a few, long ago abandoned, have been recently reopened, and hid fair, with the facilities now at hand, to prove remunerative. The above remarks apply more particularly to

Grass Valley and Its Mines.

As an instance in point of a quartz mine being resuscitated, after being dead for many long years, a company was organized last fall, under the superintendence of Mr. Geo. Lord, for the purpose of reopening one of the oldest mines of the vicinity, once the property of an English company, with a world-wide reputation for richness, having, in former times, paid very handsomely down to the depth of 140 feet, where the difficulty of handling the water and ore with the then imperfect machinery in use caused its entire abandonment. The new company have now in place two engines, one of 20-horse and another of 60-horse power, together with the necessary pumps and other appliances for successful working, and are preparing to sink with the full expectation of opening up at lower depths the same rich body of ore.

The Godfrey gravel mining company, Capt. J. S. Godfrey, Superintendent, is not a precisely parallel case, but somewhat similar, as the company have only opened up a range of gravel that had previously been considerably worked. They have a claim of 75 acres on Alta hill, above and adjoining the old shaft of the Hope & Alta, No. 2. Beginning operations in June, 1876, the shaft reached bedrock and depth from surface of 202 feet in the following November. Prior to this, hoisting works having been put up, a five-stamp mill was next erected for crushing the gravel.

The channel is represented as 300 feet wide, with pay dirt about one foot thick on the bedrock, the whole being extracted and worked. The mine has been steadily run for more than a year, employing 30 men and yielding in the time about \$35,000, the last clean-up of the mill being 110 ounces of amalgam, estimated, in gold, at \$1,000. It is said to be doing better at present than ever, being now fairly opened, and its future is thought to be exceedingly flattering, besides having the credit of giving a new impetus to much prospecting on the same range. There are several

Reduction Works

In the vicinity of Grass Valley, not less than three, for the working of sulphurets. Caillot & Co. have one of the largest establishments, buying on their own account and doing custom work from \$25 to \$27 per ton.

It may not be generally known that Mr. Arthur Cooper purchased, some two years ago, Hill's sulphuret works, since which he has been working principally the old residue on the ground both for the silver and for the gold, the sulphurets having been formerly reduced for the gold alone. Being the first in this section to attempt the extraction of the silver, it may be some satisfaction for the public to learn that it pays. Since he came into possession, the chlorates have yielded him about \$6,000 in gold and \$800 in silver. His process has simply been rechlorinating for gold and leaching with hyposulphate of soda for the silver. Mr. Henry Bush has a small establishment of a somewhat different kind, the object being the working of tailings from the quartz mills. He uses water power. Six Knox pans, with which he is well pleased, being slow but sure, and not having water for more or faster pans, puts through in the ordinary way about nine tons per week and is making a living, which is probably more than some of his neighbors can say.

A Little of the Mills.

The Omaha mills, one of 10 stamps and another of 16, are engaged on rock from the New York Hill, Alaska and Bullion mines. The Orleans, Mr. J. Smith Superintendent, is crushing rock from the Centennial mine, while the Laramie, of 19 stamps, under the superintendence of Mr. Jos. Southern, is working quartz from the Rocky Bar. The mill is run by both water and steam, with all necessary machinery complete. The Empire is kept fully employed by the ledges of the company. It has 20 stamps and is completely equipped with all the usual modern appliances, among which may be found 10 Heudy concentrators, 4 grinding pans and 2 large settlers. The completeness and extensiveness of the amalgamating department in the way of copper plates are particularly noticeable, and evidently do the work pretty effectively, as the tailings give an assay of only \$1.90 per ton. Instead of going into a description of the large 35-stamp mill of

The Idaho G. M. Co.,

A brief account will be given of the mine and

the machinery. The company is a close corporation, the stock being held chiefly at Grass Valley, and not on any of the Boards. Capital stock, \$310,000, divided into 3,100 shares, with the same number of linear feet in the mine. The prospecting shaft was commenced in July, 1865, and the company incorporated in 1867, since which there has been taken out the sum of \$4,270,255, and \$2,270,750 paid in dividends up to the last annual meeting in December last, the total amount of assessments in that time falling something short of \$40,000. The last three monthly dividends have reached \$70,750 each, the total paid to share from the first \$755. Average width of ledge, four feet, lying between serpentine and greenstone, at least so represented. While much of the quartz is very rich, and would give a large yield per ton (selected), the average for last year is set down at \$18.12, which leaves a very wide margin for profits. The greatest depth attained is 1,080 feet. Above the 300-foot level the mine is pretty well exhausted. There still remains some rock in the 600, and below this level it is estimated that there is sufficient rock to keep the mill running for at least four years.

This valuable property adjoins the Eureka, and bids fair to rival her rich neighbor in the palmist days of her prosperity. Outside of the Savage and other immense works of Lyon county, Nevada, no larger or more substantial hoisting works have been seen. Pumping machinery in like proportion. Having just taken out a Burleigh compressor, No. 4, which was found too small for their purposes, the company are now putting in place a duplex air compressor (National), cylinder, 42x18 inches, and are using the National and Ingersoll drills.

The Empire M. Co.

Operations were commenced on the mine as early as 1851, since which it has been worked most of the time, and steadily for more than 14 years past. Greatest depth, by incline, 1,200 feet. The company own three distinct ledges, varying in width from 1 to 24 inches, and containing in the aggregate about 4,500 feet in length. The mine is represented to have always paid its way besides making very many dividends, and is at present understood to be paying. The rock averages from \$15 to \$20 per ton, and the annual yield from the mine has been about at the rate of 12,000 tons.

The Centennial.

In the same vicinity, John Tremberth Superintendent, from 6 to 8 inches, occasionally widening to 18, is down 320 feet, has been worked for the past two years, and is at present furnishing rock that is yielding by mill process \$100 per ton, believed to be the general average.

The Alakea G. M. Company.

The ledge varies from 8 to 20 inches in thickness, with a species of serpentine slate on the foot-wall and granite on the hanging. Direction northwest and southeast; dip, east; greatest depth by incline shaft, 340 feet.

A drift has been run south 586 feet on the 140-foot level. One of 220 feet, and another 150 on the 220-foot level. The 275-foot level has also a drift 234 feet in length, and another is being extended from the bottom of the shaft north 155 feet, in all of which good pay rock has been found, giving an average of \$24 per ton. The last crushing of 36 tons produced \$3,700, or over \$100 per ton exclusive of value of sulphurets. The Bullion, adjoining on the north, is supposed to be on the same ledge. The work of development is being pushed energetically by Mr. M. Dodsworth who is Superintendent of both this and the Alaska. A perpendicular depth of 140 feet has been reached, and as the rich chute of the Alaska mine is within from 30 to 40 feet of the Bullion line, the company, as might be expected, are a little jubilant.

The New York Hill

(Mr. G. Johnston, Superintendent). The mine has been opened by an incline on the ledge of 800 feet. It is an east and west vein, dipping north at an angle of 30°. Average width, 12 inches. Some of the quartz in past years paid as high as \$100 per ton. The average yield the past two years, \$246,917, since which the old works have been stopped and the machinery moved to another point where developments have been in the meantime going on. As it is understood that they are crushing some quartz, it is presumably from the old works. Among the promising mines just coming to the front, may be mentioned

The New Rocky Bar,

(D. B. Kelly, Superintendent). It is situated on New York hill, and formerly known as the Chevanne ground, having been very successfully worked in early days—the former owner in fact making out of it something near \$80,000 clear. The present company in sinking discovered another ledge, which appears to be the main one. This dips south and in an opposite direction than formerly worked. The general formation is slate. They are now down, following the pitch of the ledge, 210 feet, and have just completed good hoisting works, capable of sinking to the depth of 1,000 feet. They have taken out about \$20,000 since they bought the mine, some four months ago.

It is reported that 155 loads—something upwards of a ton each—yielded not long since \$10,000, not including the sulphurets which brought them \$500, and the last lot of 110 loads paying about the same.

The Gigan,

Near by, owned by Messrs. Smith & Findley, is

Continued on Page 246.

MECHANICAL PROGRESS.

Vienna Bent Woodware.

The growing popularity of this style of furniture, first brought to the notice of the American public at the Centennial, will doubtless give interest to a brief description of the methods of making it. The industry, says the *Iron Age*, is conducted chiefly in Moravia and Hungary, but promises to become very general. Articles of this description are remarkable for their neatness, clean finish, light lines, great strength, and the fewness of their joints; this latter point being usually accomplished by bending the wood used so as to necessitate as few pieces as possible; thus, an ordinary chair contains, according to this method, only six pieces besides the cane seat, and is said to be an article which has no superior in its way. For this kind of furniture, beech is the only sort of wood used, it being found excellently adapted for the purpose. The trees being felled, the tops are removed and made into charcoal, for use in the glass works; the trunks are sawed into planks of suitable thickness by gang saws, and the planks are in turn ripped up with circular saws into square pieces for turning. If intended for the back and hind legs of a common chair, which are composed of one piece, the square piece of proper length is put into a kind of gauge-lathe, which does its work very rapidly, and varies the size where needed. The ordinary dowel lathe is used for pieces of uniform size, such as the hoops, which are placed inside of the leg to stay them, instead of straight pieces of rungs, and the hoops are so placed that the feet cannot rest upon them. After being rounded as required, the wood is steamed in the green state for 24 hours, in boilers adapted to the purpose, when it is taken out and bent to the shape desired, on a cast-iron frame, by hand. If intended for the seat, the piece is first strapped with iron on its outside, so that the bending may be a process of compression, lengthwise, rather than an expansion. It is then attached by one end to a pattern fastened to a turn-table, the other end being held by a chain wound upon a drum, to which is applied a brake, so as to regulate the tension with which the piece is delivered to the pattern; the turn-table is then set in motion, and winds the wood on its own form. If designed for a scroll, the pattern may be complicated and in several pieces, which are put in place at the proper time in the progress of the rotation; for a double scroll, two of the tension hands are employed.

Note on Boiler Making.

Prof. R. H. Thurston, of the Stevens Institute of Technology, in arranging the heating surface of a steam boiler, lays down as the essential rule that the effort be to impede the draft as little as possible, and so to place them that the circulation of water within the boiler be free and rapid at every part reached by the hot gases. The directions of circulation of water on the one side, and of gas on the other side of the sheet should, as much as possible, be opposite. The cold water should enter where the cooled gases leave, and the steam should be taken off furthest from the point. The temperature of chimney gases has thus been reduced by actual experiment to less than 300 deg. Fahr., and an efficiency equal to 0.75 to 0.80 of the theoretical is attainable. The extent of heating surface simply, in all of the best forms of boiler, determines the efficiency, and the disposition of that surface seldom effects it to any great extent. The area of heating surface may also be varied within very wide limits without greatly modifying efficiency. A ratio of 25 to 1 in flue and 30 to 1 in tubular boilers represents the relative area of heating and grate surfaces in the practice of the best-known builders, and this of course furnishes a safe criterion. The material of a boiler, says Prof. Thurston, should be tough and ductile iron, or what is better a soft steel containing only sufficient carbon to insure melting in the crucible or on the hearth of the melting furnace, and so little that no danger may exist of hardening or cracking under the action of sudden and great changes of temperature. Where iron is used, it is necessary to secure a somewhat hard but homogeneous and uniform quality for the fire-box sheets or any parts exposed to the flames.

SELF-SHARPENING PLOW SHARE OR POINT.—A very simple but effective improvement has been brought out by the New York Fallow Company, consisting of nothing more than a reversible steel point, which can be detached or replaced by another, when worn out, a common nail being used as a peg. These shares being always sharp do not require the hollow or dip which is necessary in the solid shares in order to make them penetrate when dull, and which not only requires more power, but more labor to hold the plow; at first, to keep it from running in, and then dull, to keep it from running out. These shares also preserve the wing as the plow runs level, and the wing wears sharp instead of growing thick and dull, as they must do in all plows that do not run level. Where the plowman uses the precaution to wear one side of several slips before turning any of them, and thus preserves the correct lines, the wing of the share has a cutting edge as sharp as if ground on a grindstone.

Locomotives Without Steam.

The London papers publish an account of what is known as the Walker substitute for coal in the generation of steam for locomotives or marine engines. This plan, it appears, covers an arrangement by which air is converted into hydrocarbon gas of great heating power, and is then stored in a chamber subjected to considerable pressure. From this it is forced out again, through a pipe, to the perforated tubes, from which combustion takes place in the furnace and by burning hydrocarbons—with the gas—in a gaseous or much divided state, without the adjunct of external heat to gasify or divide them. The heavy oils, in this divided or gasified state, burn over the grate in conjunction with the hydrocarbon gas. The principle as thus explained, is regarded as of extreme simplicity, and the practical arrangements are said to be equally so, insuring a certainty of operation, and, in fact reducing the question of preference to one of cost and convenience merely. The comparison for storage room and economy, in this case is shown in the following data, namely: that if the calorific power of coal per pound be estimated at 8,000 calorific units, then that of liquid hydrocarbon per pound must be taken at 13,000 units, which gives an advantage, weight for weight, of 62½ in heating power, to a liquid hydrocarbon, compared with coal. Again, in the combustion of coal, as carried out in the usual construction of boilers and fire grates, only a very small proportion of the heat theoretically developed can be made use of, while by the use of burning gas and hydrocarbon, in a gaseous form, close home to the heating surfaces, it is claimed that a much greater percentage of useful evaporation is secured.

DEFECTIVE ENGINES.—Thousands of old wasteful engines are in use, and even very many new ones are constructed on such defective principles that the consumption of fuel in connection with them is very excessive. According to the report of Mr. Hiller, chief engineer of the British Boiler Insurance Company, the following are the principal causes of the waste of fuel, etc.: Engines too small, requiring the steam the full length of stroke; others, on the contrary, being too large, and rendering its economical expansion impossible; non-condensing engines connected with low-pressure boilers, or fitted with simple valves, with no lap on the steam ports and no expansion of the steam; others with lap on the exhaust port. In many, both non-condensing and condensing, etc., the throttling action of the governor prevented free admission of the steam. It is impossible to work economically with such an arrangement. Other non-condensing engines were working at too slow a speed. Some condensing engines had no cut-off gear, or the valves were improperly adjusted, the steam being exhausted into the condenser at a high pressure, vitiating the vacuum and causing overloading of the air-pump. Others, although provided with good cut-off gear, were unsatisfactory through want of supervision, the attendants rendering it almost useless by faulty adjustment of the governor, etc. In compound engines the cylinders, in some instances, were mal-proportioned, the condensing cylinder frequently being too small, the steam-pressure not being sufficiently reduced at the point of exhaust. In others, owing to the low pressure in the boilers, or defective arrangement of the governor valve, the initial pressures were too low. Regular and careful examination of all valves, pistons, etc., is essential to insure economical working. He adds that it is a mistake to compound engines connected with weak low-pressure boilers.

CHANCE FOR AN INVENTOR.—The *Iron Age* says that the Prussian government offers a prize of \$80,000 to the inventor of a substance which is fit for the manufacture of casts from works of art. The substance required must flow into molds easily without injuring them more than plaster does. The casts must be able to undergo frequent cleansing without previous treatment. Applications, accompanied by samples in the crude and in the manufactured state, must be delivered to the Königl. preuss. Ministerium der Geistlichen, Unterrichts und Medicinal Angelegenheiten, before the first of December, 1878.

COAL AS ARMOR PLATE.—The Admiralty have directed the speedy completion of arrangements for a most important series of gunnery experiments, which are intended to determine the protective resistance afforded by layers of coal against shot or shell. If the data obtained should be satisfactory, a cheap and ready measure of defence will be available for the unarmored class of vessels in the British navy, for their engine and boiler rooms could be so completely surrounded with coal as to produce in some degree the impenetrability which is secured when they are encased with armor plates.

A NEW CORLISS ENGINE.—Mr. George H. Corliss, the well-known inventor of the Corliss steam engine, will, in a few weeks, bring out at his works, the Corliss Steam Engine Company, Providence, a new engine, embodying the most recent and valuable ideas and improvements. It will be looked for with great interest, especially by all connected with steam engineering. The original Corliss horizontal engine has been more extensively copied, not only in this country but in Europe, than any other engine in the world.

SCIENTIFIC PROGRESS.

Acoustical Phenomena.

At a recent meeting of the Royal Scientific Institution of England there was an address by Lord Rayleigh. The discourse had reference to the maintenance of vibrations producing sound. In the case of a piano string the vibrations imparted soon die away; the vibrations of a violin string may be contained by continued bowing. It was shown that a tuning fork may be made to vibrate continuously by an electric current, and an electro magnet, where one end of the wire completes the circuit by dipping in a small vessel of mercury, so that each complete vibration causes a "make and break" of the circuit. The particular branch of the subject to which the lecture was devoted was the maintenance of vibrations by heat. A simple illustration was that of Trevelyan's bars, where a rod of brass is made to rest on two leaden "knife edges," and the brass, heated by a gas flame, communicates its heat alternately to one support and the other, the communication of heat to the lead causing expansion which slightly throws up the rod, and this taking place alternately keeps up a motion. A modification of the experiment gave the motion with a continuous sound. In all cases the maintenance of the vibrations depends on the maintaining force being applied at exactly the right instant of time. The mere addition of force may in some cases cause retardation or stoppage of motion. The sound produced by a hydrogen singing flame was illustrated in varied forms, in some with closed vessels instead of open tubes, and Lord Rayleigh said he had worked out the explanation of the sound mathematically, but he hesitated to attempt to give it in a popular form. A simple glass tube with a bulb at the end when heated in a flame gave out a continued musical note, as also did a glass tube with a wire grating in it, which grating when warmed continued to maintain a note after being removed from the source of heat. With regard to many of these phenomena, Lord Rayleigh said he believed the explanations ordinarily given were inaccurate, and he briefly intimated the nature of the results at which he had arrived, but which could be more easily expressed by brief mathematical formulae than he could hope to describe at length in the hour to which he was limited.

THE YOUTH OF A PLANET.—Mr. R. A. Proctor recently gave a lecture, at the London Institution, on "The Youth of a Planet." The gradual evolution of the solar system is now generally accepted, and most astronomers recognize the enormous duration of the various stages belonging to the growth, maturity and decrepitude of each member of the solar system. Nor is it doubted that the duration of that particular period of a planet's life, when it is fit to be the abode of living creatures, is short compared with the preceding periods of preparation and the subsequent periods of decadence. This being so, the chance that two planets taken at random have synchronous periods of maturity is, of necessity, exceedingly small, and that all are synchronous is most unlikely. Yet men, in their willingness to accept a theory rather than work out its due place by getting rid of incompatible ideas, often speak of other planets as worlds like ours. Adopting, for reasons which were explained, the principle that, *ceteris paribus*, the larger members of the solar system are in the earlier stages of development or in that sense are younger than the smaller ones, Mr. Proctor described the various stages of a planet's life—the nebulous embryonic, the cometic or aggregating state, the sun-like or infant stage and the still youthful stage, in which are the giant planets, Jupiter and Saturn, showing how observed facts accord with theories as to planetary development.

MOLECULAR CHANGE BY VIBRATION.—After long use organ pipes become brittle and fall to pieces, doubtless because of the molecular change effected by vibration. The impurity of the metal does not appear to be the cause. In 1872 Oudemans called attention to the fact that plates of pure tin containing only 0.3% of lead had, during their conveyance from Rotterdam to Moscow in very cold weather, broken into very small fragments. At Spandau, more recently, similar disaggregation was observed and noted by Dr. Petri. A large quantity of tin plate acquired, first laminar exfoliations, and then began to crumble. A large quantity of block tin also became affected in the same way as the tin plates, but to a less degree. The warehouses in which the tin was stored were dry, and the cold was not severe. Repeated little shocks, with frequent strong variations of temperature, are usually supposed to be sufficient to account for the crumbling, but it would appear that there must be other causes which remain to be discovered. Dr. Petri tested the tin which had disaggregated at Spandau, but it contained no phosphorus, no sulphur, no oxide of tin, and only the faintest traces of any other foreign metal.

GOOD WORK.—The *Journal of Chemistry*, of Boston, is one of the most intelligently and ably edited journals in the world. We find it of great value and usefulness to us as a compendium of scientific and useful information.

The Phenomenon of Hearing.

The *Journal of Chemistry* recounts the ways by which one can hear without good ears. One way is by means of the teeth. Master Mace, the author of "Music's Monument" (published in 1676, and "a most delectable book," as Dr. Burney calls it), availed himself of this mode of hearing after he had become deaf. He tells us that, having invented a lute which was "absolutely the lustiest or loudest lute that I ever yet heard," he was able to hear it "in a very good measure, yet not so loud as to distinguish everything I play without the help of my teeth, which, when I lay close to the edge of it, I hear all I play distinctly." In such cases, the vibrations are transmitted by the teeth to the bones of the head, and thus to the inner ear and the auditory nerve. Bone is an excellent conductor of sound. Sounds that are very harsh and grating set the teeth "on edge," as we say, or make them vibrate disagreeably.

A simple experiment illustrates the transmission of sonorous sounds by the teeth, and also shows that solid bodies convey feeble vibrations better than the air. Lay a watch, face downwards, on a table, and stand so far from it that you cannot hear the ticking. Now let one end of a wooden rod rest on the back of the watch, and grip the other end with the teeth; close the ears with the fingers to exclude other sounds, and the beat of the watch will be distinctly audible. Other sounds may be conveyed in the same manner. If one end of a very long rod be placed on a piano and the other held between the teeth, one can distinguish the tune played though his ears be stopped.

ON SPONGES.—At the last meeting of the San Francisco Microscopical Society, the Secretary, Mr. Xenoe Clark, spoke of recent investigations in the sponges and infusoria, which add still greater strength to the theory of his father, the late H. James Clark, that the sponge is a compound, flagellate infusorian, as against the theory that it is a single individual in which the collar and flagella-bearing monads are simply tissue elements, like ciliated epithelium. This latter theory Haeckel strenuously supports in the interests of his celebrated Gastraea theory, but he does it in the face of all facts except those coming from his interpretation of the so-called "ciliated larvæ," and other interpretations favorable to Professor Clark's view have been reached by Russian, French and English observers (see Barrois, Metschnikoff and Kent) not bound to support a Gastraea theory. Kent, in the *Annals and Magazine of Natural History*, January, 1878, describes a solitary collar-bearing monad, in which he has discovered the function of this peculiar collar. It is a wonderful food-trap. The currents of water created by the flagellum carry particles of food to its exterior slimy surface; they adhere, and, by a continuous motion of the collar upon the outside, down within, and finally into the sarcod body the food is conveyed, as it were, by an endless revolving belt. Can all this complexity of function belong to a mere tissue element?

BACTERIA AT LOW TEMPERATURES.—While the action of high temperatures on bacteria has been much studied, little attention has been given to their capability of resisting low temperatures. It has been found, says the *Journal of Chemistry*, that at 0° C. they fall into a state of rigidity, but even at -18° to -25° they are not killed. M. Fisch, of the Vienna academy, recently experimented with temperatures got from solid carbonic acid, exposing to these both putrefactive bacteria and those forms of coccus and bacteria which arise in diseased products in the living body. The liquid containing the bacteria was put into thin test-tubes, which were closed with wadding, and surrounded by solid carbonic acid (in heavier glasses), on which ether was poured. The temperature sank to -87.5°, and gradually rose again in two and a half hours to 0°. The result of these experiments was that all the bacteria tested successfully resisted these low temperatures, and immediately after proved capable of vegetating rapidly in proper nutritive liquid. Whether the organisms would also withstand sudden changes of temperatures was not ascertained. M. Fisch purposes experimenting in regard to this, and also to try the effect of still greater degrees of cold.

THE ELECTRIC LIGHT IN BERLIN.—The first experiment with the electric light in Berlin was made recently in the new synagogue in Oranienburg street, before a large crowd of people. In the courtyard of the building, says the *Iron Age*, a stationary apparatus furnished the light, which was conducted over the roof into two of the five round windows, whence the light streamed down on the synagogue below. The effect was astonishing. The light was so brilliant that it illuminated the gallery and the remotest corner of the edifice. The splendor of the light was vivid, but not offensive to the sight. In comparison with gas, the result is as follows: Gas per hour, \$15; the electric light, \$1 for the same time. The apparatus costs several thousand marks. The synagogue was also lit up outside by the electric light, bringing it out as bright as day, and producing a most magical effect. Gas burned alongside of the electric light looked pale, and was, as it were, thrown into the shade.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Mar. 28.	Week Ending Apr. 4.	Week Ending Apr. 11.	Week Ending Apr. 18.
Alpha.....	81	64	73	77
Alta.....	6	4.80	54	53
Andes.....	50c	40c	50c	35c
Argenta.....	2.80	3.50	3.60	2.80
Baltimore Con.....	50c	50c	40c	50c
Belcher.....	3.30	2.70	3.10	2.85
Belmont.....	2.40	1.10	2.30	1.70
Best & Belcher.....	19	16	17	18
Bullion.....	5	4.25	4	4
Butte.....	4	4	4	4
Bodie.....	1	1	1	1
Benton.....	1.15	70c	1.10	1.10
Caledonia.....	284	27	294	304
Challenger.....	28	24	284	27
Chollar-Potosi.....	28	24	284	27
Confidence.....	21	19	20	19
Con Imperial.....	21	19	20	19
Con Virginia.....	21	19	20	19
Crown Point.....	54	4	4	4
Dayton.....	150	100	150	100
DeFrees.....	70c	25c	45c	30c
Day.....	43	39	40	41
Exchequer.....	34	23	30	25
Endowment.....	60c	55c	60c	60c
Gen Thomas.....	61	61	61	61
Gila.....	60c	65c	70c	60c
Golden Chariot.....	74	6	74	6
Gould & Curry.....	74	6	74	6
Hale & Norcross.....	81	80c	90c	85c
Hussey.....	2.60	13	3.60	2.70
Julia.....	78	67	74	64
Justice.....	3	2	4	3
Joe Seaton.....	3	2	4	3
K & K Con.....	3	2	4	3
Kentuck.....	3	2	4	3
Kossuth.....	3	2	4	3
Lady Wash.....	3	2	4	3
Leopard.....	3	2	4	3
Leviathan.....	3	2	4	3
Leeds.....	3	2	4	3
Madoc.....	3	2	4	3
Manhattan.....	3	2	4	3
Meadow Valley.....	3	2	4	3
Mexican.....	3	2	4	3
North Con Virginia.....	3	2	4	3
New York.....	3	2	4	3
Northern Belle.....	3	2	4	3
New Cosmos.....	3	2	4	3
Norway.....	3	2	4	3
Occidental.....	3	2	4	3
Ophir.....	3	2	4	3
Overman.....	3	2	4	3
Panther.....	3	2	4	3
Raymond & Ely.....	3	2	4	3
Rock Island.....	3	2	4	3
Sage.....	3	2	4	3
Seg Belcher.....	3	2	4	3
Sierra Nevada.....	3	2	4	3
Silver Hill.....	3	2	4	3
Succor.....	3	2	4	3
Solid Silver.....	3	2	4	3
Star.....	3	2	4	3
Trojan.....	3	2	4	3
Union Con.....	3	2	4	3
Utah.....	3	2	4	3
Wells Fargo.....	3	2	4	3
Woodville.....	3	2	4	3
Yellow Jacket.....	3	2	4	3

Sales at S. F. Stock Exchange.

Friday A. M., April 12.	1200	Bodie.....	11
2445 Alta.....	64	Boyle.....	40c
170 Alpha.....	60c	Belmont.....	1.10
100 Andes.....	50c	Benton.....	1.60
100 Argenta.....	50c	Bullion.....	1.60
100 Baltimore Con.....	50c	Butte.....	1.60
445 Best & Belcher.....	15c	Challenger.....	1.17
1535 Belcher.....	2.30	Chollar-Potosi.....	26c
300 Boyle.....	35c	Crown Point.....	1.40
100 California.....	50c	Dayton.....	1.40
100 Caledonia.....	50c	DeFrees.....	1.40
100 Crown Point.....	50c	Day.....	1.40
100 Con Imperial.....	50c	Exchequer.....	1.40
750 Caledonia.....	2.01	Endowment.....	1.40
115 Chollar.....	35c	Gen Thomas.....	1.40
1500 Con Washoe.....	2.25	Gila.....	1.40
50 Confidence.....	30c	Golden Chariot.....	1.40
50 Exchequer.....	2.10	Gould & Curry.....	1.40
420 Gould & Curry.....	5c	Hale & Norcross.....	1.40
340 Hale & Norcross.....	5c	Hussey.....	1.40
150 Justice.....	5c	Julia.....	1.40
2900 Julia.....	3.10	Kentuck.....	1.40
150 Leviathan.....	25c	Leopard.....	1.40
970 Mexican.....	9c	Leviathan.....	1.40
120 New York.....	5c	Lady Wash.....	1.40
50 North Con Vir.....	40c	Madoc.....	1.40
1155 Ophir.....	27c	Manhattan.....	1.40
100 Rough & Ready.....	75c	Meadow Valley.....	1.40
50 Savings.....	10c	Mexican.....	1.40
870 Sierra Nevada.....	3.10	North Con Virginia.....	1.40
660 Silver Hill.....	1.01	New York.....	1.40
100 Solid Silver.....	2.30	Northern Belle.....	1.40
100 Succor.....	3.00	New Cosmos.....	1.40
100 S. F. Stock Ex.....	1.00	Norway.....	1.40
880 Union Con.....	3.00	Occidental.....	1.40
200 Senator.....	50c	Ophir.....	1.40
1300 Trojan.....	50c	Overman.....	1.40
350 Union Con.....	4.45	Panther.....	1.40
210 Utah.....	7c	Raymond & Ely.....	1.40
3450 Ward.....	1.05	Rock Island.....	1.40
450 Yellow Jacket.....	65c	Sage.....	1.40

AFTERNOON SESSION.		100 Hemlock.....		3.94
160 Alps.....	21	165	Raymond & Ely.....	3.85
200 Argenta.....	30c	350	Sierra Nevada.....	3.00
340 Alta.....	65c	585	Sage.....	1.21
555 Belmont.....	1.30	110	Solid Silver.....	2.42
700 Belle Isle.....	50c	235	Silver Hill.....	1.05
300 Bodie.....	1.20	100	Silver King.....	1.05
150 Best & Belcher.....	15c	1070	Succor.....	1.05
145 Belcher.....	2.30	2150	Tipton.....	3.10
1365 Con Virginia.....	1.94	30	Utah.....	84c
1005 California.....	2.23	590	Union Con.....	4.60
200 Caledonia.....	2.21	2165	Ward.....	1.10
40 Crown Point.....	4.10	470	Yellow Jacket.....	1.05
400 Combination.....	1.50	270	Yellow Jacket.....	61c
1735 Day.....	70c	Monday A. M., April 15.		
710 Eureka Con.....	48c	140	Alpa.....	67c
700 Endowment.....	65c	740	Alpa.....	71c
1550 Grand Prize.....	65c	110	Belcher.....	35c
225 Gila.....	35c	170	Belcher.....	3.60
650 Hussey.....	65c	130	Bullion.....	3.85
240 Hale & Norcross.....	81c	20	Benton.....	1.60
100 Homestake.....	35c	100	Boyle.....	3.50
500 Hillsdale.....	1.65	1685	California.....	2.53
1200 Independent.....	95c	2650	Con Virginia.....	14c
635 Julia.....	3.45	60	Con Imperial.....	45c
440 Justice.....	60c	119	Crown Point.....	4.20
215 Lead.....	1.00	115	Deer Creek.....	1.00
189 Leeds.....	1.10	335	Caledonia.....	20c
235 Mexican.....	9c	1800	Con Washoe.....	30c
1610 Modoc.....	1.10	80	Conquerer.....	6.60
940 Manhattan.....	1.10	1615	Gold & Curry.....	2.61
100 McCracken.....	1.10	1615	Gold & Curry.....	2.61
100 Meadow Valley.....	20c	10	Justice.....	61c
50 Martin White.....	42c	1250	Julia.....	3.65
320 Northern Belle.....	7c	20	Kentuck.....	21
215 Nevada.....	2.60	260	Kentuck.....	92c
350 New York.....	65c	50	New York.....	70c
945 Ophir.....	2.23	29	Ophir.....	30c
70 Overman.....	9c	1145	Ophir.....	30c
160 Raymond & Ely.....	4c	330	Overman.....	10c
100 Silver Hill.....	1.10	330	Rough & Ready.....	75c
100 Star.....	1.10	1615	Rough & Ready.....	75c
650 Sierra Nevada.....	3.61	1075	Sierra Nevada.....	1.24
1220 Tipton.....	1.95	300	Solid Silver.....	21
425 Utah.....	1.10	300	Silver Hill.....	95c
50 Yellow Jacket.....	65c	300	Succor.....	75c
Saturday A. M., Apr. 15.	220	1070	Trojan.....	50c
350 Alps.....	30c	45	Utah.....	80c
390 Andes.....	2.40	2.35	Union Con.....	4.45
215 Alta.....	71c	95	Union Con.....	4.45
3550 Argenta.....	30c	350	Woodville.....	1.05
60 Alps.....	2.15	25	Yellow Jacket.....	1.05
140 Belcher.....	2.40	2.35		
300 Bullion.....	1.60	35		
200 Best & Belcher.....	15c	100		
2000 Bodie.....	50c	100		

1900 Belmont.....	75c	620 Julia.....	3.10
100 Bechtel.....	2.10	125 Leeds.....	1.05
1300 Bodie.....	2.10	400 Leopard.....	30c
170 Best & Belcher.....	15c	570 Modoc.....	2
235 Belcher.....	3.40	50 Mexican.....	80c
180 Con Virginia.....	2.18	240 Nevada.....	4.25
845 California.....	2.23	100 Meadow Valley.....	20c
30 Chollar.....	25c	50 Martin White.....	42c
500 Cose Con.....	2.55	1440 Navajo.....	1
100 Combination.....	2.10	430 Northern Belle.....	7c
1835 DeFrees.....	30c	710 Ophir.....	28c
1100 Day.....	65c	110 Overman.....	10c
90 Eureka Con.....	48c	80 Phenix.....	1
120 Exchequer.....	2.55	100 Panther.....	15c
1000 Falcon.....	15c	100 Raymond & Ely.....	35c
845 Grand Prize.....	65c	705 Sierra Nevada.....	4.25
395 Gila.....	35c	200 Silver Prize.....	12c
540 Gould & Curry.....	60c	1410 Goulet.....	12c
1200 Hussey.....	65c	100 Star.....	1.55
425 Hale & Norcross.....	81c	70 Union Con.....	4.45
750 Hornet.....	20c	40 Utah.....	80c
400 Hillsdale.....	1.65	45 Yellow Jacket.....	54c
1250 Independent.....	55c	Wednesday A. M., April 17.	
345 Justice.....	60c	100 Alpha.....	61
800 Julia.....	3.10	730 Andes.....	30c
1000 Jackson.....	30c	300 Best & Belcher.....	15c
400 Leeds.....	1.10	165 Belcher.....	1.50
675 Modoc.....	2c	335 Benton.....	1.50
220 Mexican.....	80c	450 Bullion.....	3.85
335 Manhattan.....	60c	20 Boyle.....	35c
1450 Navajo.....	1.01	210 California.....	27c
30 Northern Belle.....	7c	1410 Con Virginia.....	2.18
1015 Ophir.....	28c	250 Crown Point.....	4.40
50 Phenix.....	1c	450 Con Imperial.....	40c
100 Raymond & Ely.....	3.10	190 Caledonia.....	2.15
100 Star.....	1.50	10 Chollar.....	2.25
2315 Savage.....	12c	300 Exchequer.....	2.55
600 Silver Hill.....	85c	1550 Gould & Curry.....	60c
600 Silver Prize.....	35c	700 Hale & Norcross.....	81c
220 Succor.....	70c	905 Justice.....	3.40
895 Tipton.....	2.10	925 Leeward.....	3.40
220 Union Con.....	4.45	300 Kentuck.....	2.85
400 Ward.....	1.01	200 Leviathan.....	20c
200 Young America.....	15c	740 Mexican.....	94c
30 Yellow Jacket.....	65c	250 New York.....	30c

Tuesday A. M., April 16.	385	Alta.....	61
65 Alpha.....	61	255 Best & Belcher.....	15c
255 Best & Belcher.....	15c	340 Bullion.....	1.60
340 Bullion.....	1.60	300 Benton.....	1.60
300 Benton.....	1.60	200 Belcher.....	15c
200 Belcher.....	15c	835 Con Imperial.....	40c
835 Con Imperial.....	40c	45 Chollar.....	2.25
45 Chollar.....	2.25	1420 Con Virginia.....	2.15
1420 Con Virginia.....	2.15	705 California.....	2.15
705 California.....	2.15	495 Caledonia.....	2.15
495 Caledonia.....	2.15	1000 Con Washoe.....	2.25
1000 Con Washoe.....	2.25	150 Exchequer.....	2.55
150 Exchequer.....	2.55	990 Gould & Curry.....	60c
990 Gould & Curry.....	60c	1195 Hale & Norcross.....	81c
1195 Hale & Norcross.....	81c	400 Solid Silver.....	1.01
400 Solid Silver.....	1.01	1045 Julia.....	3.10
1045 Julia.....	3.10	425 Mexican.....	9c
425 Mexican.....	9c	100 North Con Vir.....	40c
100 North Con Vir.....	40c	100 New York.....	10c
100 New York.....	10c	1600 Ophir.....	27c
1600 Ophir.....	27c	300 Rough & Ready.....	75c
300 Rough & Ready.....	75c	1035 Sierra Nevada.....	3.10
1035 Sierra Nevada.....	3.10	3225 Savage.....	12c
3225 Savage.....	12c	1195 Day.....	70c
1195 Day.....	70c	600 Silver Hill.....	85c
600 Silver Hill.....	85c	1150 Succor.....	75c
1150 Succor.....	75c	1100 Trojan.....	50c
1100 Trojan.....	50c	250 Union Con.....	4.45
250 Union Con.....	4.45	300 Ward.....	1.01
300 Ward.....	1.01	1025 Yellow Jacket.....	65c

Afternoon Session.	700	Alta.....	71c
700 Alta.....	71c	75 Alpha.....	61
75 Alpha.....	61	300 Argenta.....	30c
300 Argenta.....	30c	200 Belle Isle.....	50c
200 Belle Isle.....	50c	510 Bodie.....	1.85
510 Bodie.....	1.85	100 Bullion.....	1.60
100 Bullion.....	1.60	400 Bullion.....	1.60
400 Bullion.....	1.60	200 Bechtel.....	2.10
200 Bechtel.....	2.10	300 Con Virginia.....	1.51
300 Con Virginia.....	1.51	100 Grand Prize.....	65c
100 Grand Prize.....	65c	170 Grand Prize.....	65c
170 Grand Prize.....	65c	150 Hale & Norcross.....	81c
150 Hale & Norcross.....	81c	150 Hussey.....	65c
150 Hussey.....	65c	80 H & Norcross.....	81c
80 H & Norcross.....	81c	100 Hamburg.....	35c
100 Hamburg.....	35c	100 Hillsdale.....	1.65
100 Hillsdale.....	1.65	700 Independent.....	55c
700 Independent.....	55c	330 Justice.....	55c

SALES OF LAST WEEK AND THIS COMPARED.

Thursday A. M., Apr. 11.			Thursday A. M., Apr. 18.		
105 Alpha.....	61c	1030 Alta.....			
105 Andes.....	25c	160 Alpha.....	71c		
1190 Alta.....	61c	80 Andes.....	30c		
80 Belcher.....	3.40	305 Best & Belcher.....	15c		
140 Bullion.....	3.90	240 Belcher.....	3.40c		
450 Boyle.....	50c	500 Benton.....	1.17		
40 Baltimore Con.....	50c	285 Bullion.....	3.35		
870 Benton.....	1.60	400 California.....	40c		
275 Belcher.....	2.2c	450 Caliform.....	40c		
295 California.....	2.23	1730 Con Virginia.....	1.64		
1720 Con Virginia.....	1.91	220 Chollar.....			
100 Crown Point.....	4.10	228 Crown Point.....	4.30		
100 Caledonia.....	2.15	745 Con Imperial.....	40c		
500 Con Washoe.....	2.25	2500 Con Washoe.....	2.60		
2100 Exchequer.....	2.55	300 Exchequer.....	2.60c		
615 Hale & Norcross.....	81c	2100 Gould & Curry.....	70c		
150 Hillsdale.....	1.65	150 Hale & Nor.....	81c		
1100 Julia.....	3.10	150 Julia.....	3.1c		
200 Justice.....	61c	230 Leviathan.....	1.15		
1000 Ketchikan.....	1.08	470 Mexican.....	91c		
50 Kentuck.....	1.08	500 Mexican.....	1.08		
100 Leviathan.....	25c	50 North Con Vir.....	20c		
45 Lady Wash.....	50c	845 Ophir.....	2.2c		
380 Mexican.....	101	540 Overman.....	131c		
1450 New York.....	65c	2100 Rough & Ready.....	2.55		
200 New York.....	65c	615 Hale & Nor.....	81c		
500 North Con Vir.....	90c	985 Sierra Nevada.....	4.45		
1093 Ophir.....	32c	670 Silver Hill.....	85c		
300 Overman.....	102c	700 Solid Silver.....	21c		
2000 P. J. Hunt.....	20c	775 Sucker.....	70c		
200 Succor.....	75c	500 Union Con.....	4.45		
300 Sierra Nevada.....	3.15	100 Utah.....	101		
270 Savare.....	91c	385 Union Con.....	4.45		
450 Solid Hill.....	1.08	925 Ward.....	90c		
450 Solid Silver.....	20c	100 Wells-Fargo.....	35c		
600 Trojan.....	55c	100 Wells-Fargo.....	35c		
58 Utah.....	61c	475 Yellow Jacket.....	1.60		
215 Union Con.....	4.60				
450 Wells-Fargo.....	35c				
420 Ward.....	1.10				
150 Woodville.....	45c				
435 Yellow Jacket.....	61c				
AFTERNOON SESSION.					
100 Argentina.....	30c	400 Alta.....			
250 Alos.....	2.40	600 Argentina.....	30c		
800 Alta.....	61c	300 Belmont.....	90c		
1700 Benton.....	1.10	200 Belle Isle.....	30c		
200 Belle Isle.....	50c	410 Best & Belcher.....	15c		
120 Best & Belcher.....	15c	375 Belcher.....	3.65		
2000 Belmont.....	1.40	230 Ecdict.....			
250 Bodine.....	1.05	295 California.....	2.7c		
430 Bodine.....	1.05	300 Bodine.....	10c		
40 Con Virginia.....	13c	315 Crown Point.....	4.10		
100 Caledonia.....	2.15	850 Cose Con.....			
200 Combustion.....	15c	780 Caledonia.....	21c		
1300 Combustion.....	15c	300 Falcon.....	16c		
1325 Day Freight.....	85c	420 Day.....	25c		
75 Eureka Con.....	43c	1835 DeFrees.....	30c		
220 Falcon.....	40c	160 Eureka Con.....	5c		
770 Grand Frize.....	61c	650 Endowment.....	65c		
30 Gil.....	1.08	300 Falcon.....	16c		
215 Hussey.....	10c	270 Grand Frize.....	61c		

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

NEW SULPHURET WORKS.—*Ledger*, April 13. The sulphurets of Mr. N. L. Gage, being erected at Sutter Creek, will be completed inside of a month. They will have capacity to reduce three tons per day.

KEYSTONE.—While the ore now being put through the mill is not so high grade as in former days, it still pays. While the quantity of rich ore in sight is limited, the lower grade is present in inexhaustible quantities.

FIDDLERTOWN.—Mining here is in a healthy condition, several companies having cleaned up lately with good results.

LINCOLN.—The first clean-up since the striking of the high grade ore in this mine was made last week. A run of fifteen days, yielded \$21,000. The quantity of rock crushed was 1,421 tons, and the average yield \$15 to the ton.

AMADOR CONSOLIDATED.—Last clean-up for a run of thirty days, \$16,700. A good ore-body is being developed in a part of the property which has been little prospected, and a number of stamps are kept running on this new rock.

CREEK MINING.—S. S. Mannon and others have taken up for mining purposes the head of Sutter creek. Into their claim, the tailings from the Amador mill have been dumped for a generation. In the earlier days of quartz mining, when the machinery was not so well adapted for saving fine gold as now, large quantities of the precious metal escaped the batteries and found a resting-place in the creek. Besides this, the sulphurets were not saved in those days, but passed away with the tailings. These alone, independent of the free gold, would make the claim valuable. The miners have profitable work ahead for many years.

BUTTE.

MINING ITEMS.—*Mercury*, April 12: O. P. Powers cleaned up about \$5,000 the other day, after a six months' run. Cherokee sent down a \$15,000 bar of gold a few days since. Last Monday \$65,000 was shipped to the mint by Wells, Fargo & Co.'s Express. The Ophir mills will not run this summer, the proprietor having concluded to spend the summer visiting his relatives East.

CALAVERAS.

UPPER COUNTRY.—*Chronicle*, April 13: All the mills in the upper country are now running and times are lively. At West Point Champion ore is being crushed in Carlton's mill. The Hall mill is running on rock from the Terry & Co. mine. At Mosquito the Garland mill is crushing rock from the Etchevery mine. There is about a hundred tons of it altogether—reported to be exceedingly rich. A large quantity of ore is on the dumps of the San Bruno and will be "tackled" by the mill soon. Holmes, who purchased the Peter Gass mine, is putting hoisting works on to the property. Rumor has it that the Banner mine troubles have been settled and that work will be resumed upon that promising property shortly. Also reported that work is soon to be resumed on the Tiger mine at Rich Gulch flat.

NEW GRAVEL DISCOVERY.—We learn that new gravel diggings have been discovered on the creek that empties into the middle Fork of the Mokelumne about a mile and a half below Lindsey's ranch, eight miles above West Point. The gravel is reported to be rich and extensive.

DEL NORTE.

NEW DITCH.—*Crescent City Courier*, April 3: We learn of the organization of a company in Oakland, whose intention it is to dig a ditch several miles in length, and bring water on Haynes flat, in this county. We should judge this to be a profitable enterprise if carried through. The flat is said to contain extensive placer mines, and the only drawback to their not being worked heretofore, was the lack of water, which this enterprise will remedy.

INYO.

DEFIANCE.—*Coso News*, April 6: One furnace running and turning out bars of bullion at the usual rate, the other will resume operations shortly when the track is laid for cars to run out ore.

SHUT DOWN.—Superintendent Hutchings has shut down the Rex Montis mill, which has been running on tailings for a short time past, a step necessary to facilitate the work of the complete reconstruction of the mill in contemplation, and soon to be begun.

MARIPOSA.

RICH ORE.—*Gazette*, April 13: After running a tunnel 300 feet, giving a backing of 600 feet, in the Victor copper mine, of Hunter's valley, Joseph Quierolo has struck upon a fresh body of exceedingly rich ore, about four feet thick, which, if equaling the specimen we have received, is ahead of any production of mineral ore ever found in the county. The specimen before us contains copper, gold and silver, and would, it is said, assay a thousand dollars per ton; and the whole body of ore just struck, it is estimated, will average \$300 per ton.

NEVADA.

LIBERTY AND LOWELL HILLS.—*Transcript*, April 14: There is sufficient water at Liberty hill to keep the monitor going full time, and the prospect for a successful season was never

better. Mr. Bates, the foreman, got \$600 coars gold in one pan last week. The whole territory between the two hills has long been located, and work in all the tunnels is being pushed vigorously forward this spring. The owners of the Swamp Angel have run three prospecting drifts from their main tunnel with favorable results. It is reported that this claim will hold in a short time for \$40,000.

THE WATT AND DERBEC MINES.—According to surveys, the Watt shaft will have to reach a total depth of 500 feet, and the Derbec of 610 feet, before striking the pay channel. The projectors, however, are confident of achieving the most unbounded success ultimately; for every indication goes to demonstrate that they are on the right track for a bed of unusual richness, and the development of these mines will give encouragement to other embryo enterprises of a like nature, which will shortly prove the Bloomfield district to possess what has long been claimed for it—vast deposits of gold-bearing gravel which have never been excelled for richness and extent in any part of the world.

THE BYRNES COMPANY.—*Grass Valley Union*, April 13: A company has been formed under this name to work the quartz mines on Gold flat, near Nevada City. The property embraces 120 acres and several quartz locations more or less developed. On one, the Potosi, there is a shaft down 300 feet, and drifts run a sufficient distance to give over 200 feet of hacks, from which has been taken rock that averaged \$12 per ton. The property has remained idle for some years owing to conflicting interests, but all questions of title having been satisfactorily arranged, the new company will proceed immediately to the development of what is considered a very valuable property. Hoisting works will be erected on two separate locations, and a mill will be built some time during the season. The building of the hoisting works will be commenced in May. Gold flat has been noted for its rich float quartz in the surface diggings, from which many a miner "gathered his pile" in the early days, and the feeders, the quartz ledges, have always been regarded with favor as soon or later to be developed into rich mines.

PLACER.

NOTES ON THE MINES.—*Herald*, April 13: At Shurtliff's mine, on Duncan hill, men are running a tunnel to tap the ledge at a depth of several hundred feet and afford drainage and means of working the mine. The length of the tunnel will be about 500 feet, of which 160 is completed. Messrs. Spring & Holcom are working a new quartz ledge near the Eclipse mill; though down but a little way, they have a very encouraging prospect. Simons & Pelster are also taking out some very fair rock from a ledge they are working on North ravine. The Good Friday has recently been started up by the Werry Bros. Mr. Hooper has recently leased the Shoo Fly ledge and is working it with good results. The Osborn Bros. are at work on an extension of the Shoo Fly lead, and are also getting a good prospect. The Trembling Bros. have a shaft down near the old Bellevue mine, and by means of a whim are hoisting some good ore. On North ravine and other ravines in the vicinity considerable sluice mining is being done during the present abundant water supply, and in most cases the miners in this line are getting fair wages at least. Chinamen with their pans, rockers or sluices can at present be found in nearly every little gulch in the hills; with free water these fellows can scratch out Chinese wages almost anywhere. Even in the little ravine on Nevada street, just in the edge of town, a Chinaman with pick and pan has been crevicing around for the last week or two, and it is not to be supposed he would stay there so long unless he found something. At various points on Auburn and Dutch ravines between here and Gold Hill, several gangs of Chinamen, consisting of from 10 to 15 each, are at work sluicing, though with what results cannot be ascertained, as whether good or bad, they always say "no holly good."

PLUMAS.

STRIKE.—*National*, April 6: At the depth of 800 feet, a fine gold-bearing ledge has been struck in the Bell mine, the ore showing large prospects. The high shaft now being sunk in the bed of Jamison creek is now down about 115 feet. The boys expect to get bottom and rich diggings in 35 or 45 feet more. All the Light's canyons miners are getting to work with big prospects.

SHASTA.

COPPER CITY.—*Reading Independent*, April 11: The Extra company is getting ready to put up a 10-stamp quartz mill, most of the machinery being on the ground. Ore is being taken from their mine. They have a splendid ledge about eight feet wide, have crosscut it in several places, and found it well defined. Ore will work about \$140 per ton; company work about 30 men. The Winthrop company in sinking their shaft have cut a well defined ledge, and have a large lot of ore on their dump. They have a good site and talk of putting up a mill soon. The Northern Light company are at work on their mine, which looks well and has yielded some good ore. The Bully Hill sinking shaft with good prospects. The Flat Creek company have a narrow, rich ledge. Much prospecting is going on in the vicinity. There are several districts in this neighborhood that prospect as well as any in the State. O. P. Woodward cleaned up 166 ounces of gold from 19 tons of rock, last week.

HYDRAULIC OPERATIONS.—*Tiffin*, Breslau & Vandevier, one mile above town, have in sight

an immense gravel bed that prospects well from top to bedrock, enough to last them as long as they will want to follow this business. They are also owners of a fine water privilege with good ditches, which afford plenty of water through the mining season for hydraulic, and have a pressure of about 95 feet. It is expected that their clean-ups will run from \$10,000 to \$20,000. Last week Charles Bell and partners took out \$3,600 on a clean-up from their arastra after a nine days' run.

SIERRA.

FORREST CITY.—*Mountain Messenger*, April 13: The North Fork company has been washing gravel that paid extremely well.

The Bald Mountain company have made a splendid wash-up and continue the work of running out rich gravel.

The North American drift mine, at the head of State creek, has changed hands, having been purchased by Judge Clough, S. Wheeler and M. Schofield, who have had the property on a lease for some years past. The mine has paid well since these parties took hold of it.

QUARTZ MILL.—Campsville is soon to have a quartz mill erected in its vicinity, on what is known as the old Brooks ledge, by San Francisco capitalists. The ledge at this surface paid, but like the Brush Creek pinched out as it went down. It has been sunk upon and found to come in again as good as at first.

TRINITY.

TRINITY CENTER.—*Journal*, April 13: Miners are all hard at work and doing well. Some new claims are being located in this vicinity, which encourages our business men.

MINES ELSEWHERE.—Smith & Lowden, on Carter har, Trinity river, made another clean-up last week with satisfactory results. The Buckeye company are pushing things at Boalt's hill, and will make a big summer's work.

Nevada.

WASHOE DISTRICT.

CALIFORNIA.—*Gold Hill News*, April 17: Daily yield, 600 tons of ore. The ore stops on the 1650 level are yielding rich ore and are showing well. The ore breasts going south on the 1600 level also show splendidly, and are yielding good ore. On the 1550 level the usual amount of first-class ore is being extracted. A winze has been started from crosscut No. 5 on the 1550 level to connect with the 1600 level, for a better ventilation of the ore stops in that portion of the mine. The ore in the face of the south drift on the 1600 level is not of so high a grade as for some time past, although it is yet of a good milling quality. Sinking the C. & C. shaft is being pushed vigorously forward, the flow of water in the bottom being quite strong.

CON. VIRGINIA.—Daily yield, 600 tons of ore, keeping the mills husy crushing as usual. The new ore stops on the 1750 level are showing well and yielding good ore. The south ore stops on the 1650 level are also producing first-class ore. The south drift on this level, being run in advance of the ore stops, also continues in excellent ore. A large quantity of excellent ore is being taken from the west and south stops on the 1400 level.

WARD.—Considerable of a flow of water was encountered in the bottom of the shaft, which impeded the sinking somewhat during the first part of the week. That has been drained, however, so that the sinking was again going ahead.

JUSTICE.—The Santiago mill has been shut down, and the production of ore reduced to just enough to supply the Pacific mill. This permits of the raising of the grade of ore crushed, so that the profit on the bullion produced will be much better. The upraise on the 1300 level, to connect with the bottom of the winze below the 1150 level, is making steady and favorable progress. The east drift on this level shows streaks of quartz and clay slips that evidence a near approach to the main ore vein. A drift north on the 1300 level has just been started to prospect that portion of the mine. The south drift on the 1000 level has connected with the Silver Hill, giving an excellent circulation of air from the surface down to that depth. Two crosscuts have been started eastward on this level, one 100 feet north of the Silver Hill line, and the other 150 feet still north of that.

NEW YORK.—Sinking the main shaft has been somewhat interfered with during the past few days by an increase of the flow of water at the bottom. This delay is, however, only temporary, and everything will again be running as usual in a day or two more. The face of the south drift in the ore vein on the 1000 level is still in a splendid character of quartz, carrying occasional spots of ore.

OPHIR.—The winze below the 1900 level is being sunk at the rate of two feet per day, the bottom still showing some quartz and streaks of ore mixed with porphyry, the most of the ore having passed over to the east side of the shaft. The south crosscut No. 4 cut through the ore vein during the first part of the week, showing it to be poor and very narrow at that point.

CROWN POINT RAVINE.—The new wire cable has not yet arrived, but will during the week, when it will be placed in working operation at once. Meanwhile, a new cage has been constructed, and, as soon as the cable arrives, the cage guides will be put into the shaft, and after requisite repairs to the timbering, sinking the shaft deeper will be commenced.

YELLOW JACKET.—On the 2000 level the south drift completed connection with the drift north from the Crown Point last night. This connection is a very important one, giving much needed ventilation as well as increased

facilities for working both mines at that depth.

SILVER HILL.—Sinking the main incline is going steadily forward, the bottom in hard blasting rock. The east drift at the 900 station is being pushed rapidly ahead, the face in clay and porphyry. The indications in this drift lead to the belief that it will not have so far to run as the drifts on the levels above to reach the ledge.

LADY WASHINGTON.—The north drift on the 1050 level is being driven vigorously ahead, following the west wall of the ore vein, and still continues to show good quartz and ore.

CALEDONIA.—The north drift on the 1600 level is being pushed steadily forward to connect with the joint winze on the Overman south line, below the 1400 level. This face is in very favorable vein material.

OVERMAN.—The east prospecting drift on the 1100 level is rapidly advancing toward the ore vein, the face in good blasting ground. Sinking the main shaft is going ahead at the rate of three and a half feet per day, the bottom being in good working ground.

SENATOR.—During the past week the Sutor Tunnel being has developed nothing new in drifting westward, showing regular Comstock ledge matter, with occasional streaks of low grade ore. The recent favorable ore development, east, at the 1640 level of the Savage, is directly toward the Senator mine, and very nearly on a level with the Sutor Tunnel.

GOULD & CURRY.—Some delays have been experienced during the week in getting down to the 1900 level, on account of the great heat. These have been overcome, however, and this morning the water was nearly drained from the drifts on that level. The new ore discovery in the east drift on the 1640 level of the Savage has infused new life and hopes into the managers of this mine, it being an apparent fact that no prospecting ever yet done in the mine was far enough to the eastward to reach the new ore channel.

SUTOR TUNNEL.—Total length of tunnel last evening from mouth to face of header 19,426 feet. The header is still in regular Comstock ledge matter, quartz, porphyry and clay, with occasional streaks of quartz giving low assays. It has passed about two-thirds through the Senator mining company, and is pushing onward toward the Savage, with which mine it will connect at the 1640 level. The recent ore development in the east drift or crosscut of the Savage at that level shows that important deposits of ore are very likely to be found in the intervening ground.

BEICHER.—The repairs to the pumping machinery are completed, and sinking the main north incline is being pressed ahead with all the vigor possible.

JULIA CONSOLIDATED.—Sinking the main incline below the 2000 level is being pushed rapidly forward, the bottom in good working ground.

HALE & NORCROSS.—The water is down to the 2100 station to-day. The flow of water is completely under control of the pumps, and unless some breakage occurs to cause a stoppage of the pumps, no further trouble in getting the water out may be apprehended. The striking of a new east ore vein on the 1640 level of the Savage is giving new encouragement in this mine.

SIERRA NEVADA.—The face of the east drift on the 1700 level has shown something of an improvement during the last few days, there being more quartz mixed with the clay and porphyry in the face.

CROWN POINT.—Sinking the double incline winze below the 2000 level is making the usual good progress of five to six feet per day. It is now down 440 feet on the slope below the 2000 level or perpendicularly to within 20 feet of the 2300 level.

MEXICAN.—The joint east drift on the south line of the Union Consolidated on the 1600 level is making fair progress, the face in vein matter.

BALTIMORE AND AMERICAN FLAT.—The north-east drift on the 1400 level is steadily advancing to reach and prospect the ore vein, under where the good ore was found in the winze sunk from the 1050 level.

BULLION.—The east drift on the 2000 level shows no important change; the face is still in vein matter of an encouraging character.

SUCCESS.—The drift recently started on the vein of quartz at the 1050 level is making good progress, and the quartz is gradually widening and increasing in value as the drift advances.

ELY DISTRICT.

A GLANCE AT THE MINES.—*Pioche Record*, April 6: Developments on the Alps are retarded by hard rock and bad air, though the vein is opening well on the 12th level and stopping will begin next week. Some good ore is coming from the slopes between the seventh and eighth levels.

In Raymond & Ely, are working on nearly every level up from the 10th, also doing considerable new work, taking out 15 tons of ore per day, which is being shipped to mill. The mill and foundry are continually kept busy.

HILLSIDE.—Winze from drift on first level is 15 feet down and all the way in ore. Do not know extent of the ledge, as have not got to the walls on either side. Intend pushing the winze down to a depth of 100 feet. Have started shipping ore for a test from both the Hillside and Tempest mines to the mill in Condor canyon.

DAY.—Have not been sinking any on the winze for the past two weeks, but have been breasting and stopping the ore out and are now

Continued from page 242.

made up of several small rich veins, 21 tons yielding \$3,000, or nearly \$100 per ton.

The Pacific.

Adjoining, owned by Messrs. Ford, Mullen & McDonald, is said to have produced some \$400 rock, or on an average upwards of \$100 per ton.

The Knight of Malta.

Owned by Mr. T. H. Moore, is what may be considered one of the fine prospects, but not at present worked for want of capital to put up the necessary machinery. It should have been mentioned in proper order in connection with the noted Idaho and Eureka mines, as it is on the same line and thought to be an extension of the same ledge, the formation being precisely the same, and size of vein (49 feet) corresponding. It has been opened to the depth of 50 feet. Some of the rock has milled \$12 per ton.

Such a prospect ought not to lie idle for the want of the wherewith to push it, with so much capital in the State, seeking for investment.

Rough and Ready.

But little could be learned of their quartz operations.

The Torpie company—working in gravel—having stripped off, last winter, the top dirt down to what was at the time supposed to be bed-rock, and not finding gold in sufficient quantity to pay, they concluded to sink through a strata of volcanic ashes and decayed boulders (that require but the slightest blow to cause them to fall to pieces), whereupon they found themselves well rewarded for their perseverance. They passed through a body of gravel six feet thick superimposed on the true bedrock, that is now paying handsomely.

The San Francisco Copper Mine, Situated at Spenceville, in the southwestern part of the county and within 12 miles of Wheatland, Yolo county, has been opened to the depth of 150 feet. Three different cross-cuts have been run, developing a solid body of ore from 75 to 100 feet wide, the ore averaging about 7% copper. The company have patents, which cover in the aggregate 3,000 feet of ground.

While at the mine the following facts were gleaned as to

The Process of Working.

In the first place, a portion of the ore is roasted in stails and some of it in heaps, the time required for the purpose being from three to four months.

Second, it is conveyed to wooden tanks where it is leached.

Third, the liquor is now transferred to barrels, and the copper precipitated by means of old scrap iron, requiring about two hours for a charge of 2,000 gallons. The strength of the solution is about 15° (Baume), each charge containing about 150 lbs of copper.

The company at present are working two barrels and have also two more nearly completed, and keep on hand at least 6,000 tons constantly roasting. The total of copper yielded by the mine the past year has amounted to 350,000 lbs, which readily brings in the market 17 cents per lb. This is said to be the principal mine, if not the only one in the State, that is producing in quantity what is known as cement copper, which averages 90% fine. A. C. K.

Mining Notes from Siskiyou.

EDITORS PRESS:—Last week I paid a visit to Callahan's ranch and South fork. In conversation with Mr. Diggles, of Fort Jones, he informed me that the new flume of Parker & Co. was the 'best ever constructed in this county. As Mr. D. has been here over 20 years, and is considered authority regarding mines, etc., I felt an interest to see it, which I did last week. It is called Montezuma, and is situated near the junction of the south and east forks of Scott river, near Callahan's ranch, and it is owned by Alex. Parker, H. Peterson and A. N. Denny; Parker supplying the capital and Peterson superintending the work. The flume was commenced a year ago, and is now about finished, cost, \$15,000. It is three-quarters of a mile long, six feet wide, and 44 inches deep. The blocks used are nine inches thick. There is one inch fall to every box of 12 feet. The old flume was used six years, but was too small, being only three feet wide and 20 inches high. Water has been turned into the new flume. They have a good head and the claim prospects well. About 20 men are employed here, three-fourths of them Chinese. It is intended to run everything through except the large rocks, which are moved by derricks. When they get under good headway, I expect to visit the flume again, and may have more to say about it. At South fork I found the people just commencing this season's work, with a cheerful outlook. Cumins' quartz mine, on Boulder creek, prospected well when the last work was done on it. Cogins showed me a nice piece of quartz found by him lately, the gold plain to be seen in it; he thinks the ledge is good. Walsh lately picked up a piece of gold on his claim worth \$10.75. There is much good placer ground in this section, but somehow the Chinese have managed to gobble up the most of it, and it seems a pity that so much of the best paying ground should be owned and run by that people to the exclusion of our own race. R. D. NUNNALLY.

Etna Mills, Siskiyou Co., April 9th, 1878.

THE ENGINEER.

Mining Engineering School on the Pacific Coast.

Dr. G. F. Becker, Professor of Mining and Metallurgy at the University of California, presented to the Assembly Committee on Education a statement of the needs of his department. From this statement we shall quote a few paragraphs, showing the field and need for a fully equipped college of mining engineering on this coast:

If there is need of a school of mines anywhere in the world, it surely is here; nor are there many persons who will deny the desirableness of special instruction being given at the University of California, in those branches of learning which are related to mining and metallurgy. The enormous losses arising from ignorance in this branch of industry are notorious, and no one can possibly maintain that education is not at least as valuable to men engaged in this pursuit, as to farmers or machinists. Yet very little has been said in public on the subject, and the Legislature, though it has passed an enactment establishing a Mining department, has appropriated nothing towards its support, except the share which it will receive in the accommodations of the new Mechanical Arts College building. The cause of this fact is to be sought in the absorbing nature of the occupation of mining, and the consequent lack of participation on the part of miners, through their Unions or otherwise, in public affairs of any sort. The development of the College of Mines has formed the especial concern of no particular person or body. It awaits the active interest of gentlemen in a position to emphasize its claims, and with the spirit to undertake the task simply because the object is a worthy one, and in the absence of any decided pressure of public opinion.

I cannot but think that the objects to be attained would repay the exertion of fostering this branch of education. The University of California must always be the center of education for the whole Pacific coast, and no more important or favorable position (London alone, perhaps, excepted) exists for a school of Mining Engineering. This would be true were the natural and technical conditions of the Pacific coast not peculiar. In fact, however, they are unique, and engineers trained under the very dissimilar circumstances prevailing at other centers of education, are necessarily obliged to modify their habits of thought. Their rules of action and their methods of procedure vary essentially to adapt them to the nature of this region. The New York School of Mines must unavoidably lay the stress of its teachings upon the manipulations of iron and coal, the same is true of the schools of Paris and Loudon; while at Freiberg, for example, the conditions of fuel and labor and the absence of free gold ores, renders the appropriate course of instruction only partially applicable to our mining regions. One of the great mining schools of the world is, therefore, destined, sooner or later, to grow up at Berkeley. An institution which will prepare the men who will have charge of the first interest of the coast, and which will also be actively and profitably engaged in the no less important task of bringing to bear upon the thousands of weighty problems presented in the extraction and treatment of ores, the resources of systematized experience accumulated by men of many pursuits in all portions of the world.

Can any one say that it is too soon to begin this work, when the present year will complete the sum of 2,000,000 of gold and silver extracted from the mines of the Pacific slope?

Railroads and Water-Ways.

M. Freycinet, the French Minister of Public Works, makes the following reference to the canals of France, but his propositions are of interest to engineers everywhere:

Navigable water-ways play an important part in the production of the wealth of a country. If it was thought at one time that their usefulness was about to cease, and that they would soon give place entirely to railways, that rather superficial view has not been long in being modified after an attentive examination of the facts. It has been found that navigable water-ways and railways are not destined to supplant but to support one another. Each has its particular attributes. Railways take the least cumbersome traffic, that which requires speed and regularity, and bears most easily the cost of carriage. Water-ways take heavy goods of low value, which only pay for being carried when the cost of carriage is low, which afford railways only an illusory revenue and encumber instead of feeding them.

Navigable water-ways fulfill another object. Their mere existence checks and moderates the rates on goods which are sent by railway; they are a warning to railroad companies not to exceed the limit beyond which trade will not hesitate to sacrifice regularity to economy. In this respect navigable water-ways are much more serviceable than competing railways, for these, fighting each other with equal weapons, generally end by coming to an understanding to avoid inevitable ruin; while the canal boat and railway naturally divide the traffic by taking that which suits each best.

The country has an evident interest, there-

fore, in not neglecting its means of water carriage while it is engaged in developing its railway system. Public opinion regards it in this light and the Legislature has for several years given repeated proofs of its interest in this object.

The steps to be taken to arrive at certain results appear to me to be the same as we have taken in regard to the railways, and which I may here mention. Technical and administrative commissions would likewise be appointed, one for each of the six natural basins of France. They would be composed of similar members, except, of course, in regard to such modifications as the different nature of the subject requires.

The object of these commissions will be, on the one hand, to design new lines, whether of canals or canalized rivers, intended to complete the system of general interest; on the other hand, to settle the basis of the transformation and improvement of existing lines to render them compatible with the new wants of the navigation.

Outside this system regard must be had to the necessity of making a certain number of canals of special utility, which may be conceded for a limited time to departments or communes. These will be the germ of a system of local interest, comparable in certain respects with that of the railways.

The improvement of navigable water-ways necessarily includes that of seaports, without which our canals and rivers would be incapable of being fully developed. All merchandise passing into and out of the country must pass through the ports. The ports, therefore, must keep pace with the movement of commerce, follow the development of traffic and maintain the struggle with foreigners.

Indian Irrigation Works.

In Lord Salisbury's despatch to the Governor-General of India there is the following paragraph: Very much stress has been laid from time to time upon the financial and other advantages to be derived from expenditure on these works, and during the past autumn the construction of them in the Madras Presidency upon a vast scale has been strenuously urged. The fact that demands of this kind have recently been made by persons of authority would of itself suffice to make a searching investigation of the question highly expedient. If there is room by such undertakings materially to relieve the Madras people from so much suffering, and the Indian treasury from an intolerable burden, the construction of the works ought to be commenced with the least possible delay. If, on the other hand, this resource is not to any great extent available, and any such undertaking, on the contemplated scale, would only impose fresh burdens on the taxpayers, without effecting any notable diminution of the evil, it is of high importance that the evidence of that fact should set forth with sufficient fullness and cogency to dissipate all illusion upon the subject. In the reports which your Excellency has forwarded me from time to time, I find much to lead me to believe that the very cause which produced the famine in many cases has made irrigation works wholly or partially ineffective. The same want of rain which parched the fields, emptied the tanks, and lessened the volume of the rivers. The absence of glaciers in the hills of Southern India would naturally render the irrigation canals far more liable to be affected by want of rain than similar works in the valleys of the Ganges and Indus.

Replying to a letter from Mr. E. Jenkins, M. P., Mr. Burke, Secretary of the Indian Irrigation Society, wrote as follows: "Most of our committee are of opinion that a judicious extension of irrigation canals is one of the urgent wants of India, and as regards Sir Arthur Cotton, although all the other members of our committee do not necessarily go as far as he does, he can scarcely be called a mere 'theorist' even by those who do not agree with him, inasmuch as he himself constructed the two most practically successful irrigations works in India—the Godavery and the Tanjore canals—which are paying, according to the government returns, not less than 86% and 21% per annum respectively on the original outlay."

THE IMPROVEMENT OF THE MISSISSIPPI.—We have already described the proposition of Mr. Eads to improve the navigability of the great river for more than a thousand miles of its course. It seems that other propositions are also considered. The St. Louis *Journal of Commerce* says: The Committee on Levees has before it another bill, which the Southern members are urging forward, and it was thought best not to intrust the interests of this matter in their hands. They preferred, therefore, to have them left with the Committee on Commerce. A bill was introduced by Mr. Knapp, of Illinois, which embodied all the desires of the St. Louis Committee, and it is now pending. A fact in favor of the bill is that it harmonizes with the work already accomplished by the Government engineers, and, when the improvement is once begun, it will not be difficult to secure further appropriations to advance the work until it is completed. The entire appropriation expected for internal improvements will not exceed \$6,000,000, so that it would be useless to ask anything like the amount required by Capt. Eads' plan, which would require at least \$40,000,000. It is true, said Mr. Brown, that Capt. Eads accomplished a great work for

the West when he opened the jetties, but he has still much to do before it is completed, and if it required \$5,000,000 to improve two and a half miles there, what would it cost to improve 1,200 miles? Mr. Brown feared that Senator Cockrell's hills was a waste of time, because it provides only for doing work that has already been done by Government engineers, and would delay any improvement for two years. What is wanted, therefore, and what, in Mr. Brown's opinion, is the thing to be done, is to push Mr. Knapp's bill, and, if possible, secure its passage the present session, and thus get an appropriation for immediate work.

FRENCH RAILWAY SYSTEM.—M. de Freycinet's great railway scheme for the interior of France is occupying a good deal of attention just now. He estimates that to complete the net work required for the development of the country, 16,000 kilometers of railway iron has to be constructed. Estimating the average cost at 200,000 francs per kilometer, which will entail a total expenditure of three milliards two hundred millions, he thinks that at the rate of 320,000,000 a year the country will be able to complete the whole in 10 years. The *Journal des Chemins de Fer* considers the scheme rather visionary, and subject to so many vicissitudes as to be impracticable. The *Moniteur des Interets Matériels* thinks differently, looking at the enormous vitality and resources of France, and considers that the minister is taking a broad and patriotic view of French economies which will be justified by the result.

More About Woodward's Gardens.

A late issue of the PRESS gave a cut and an outline sketch of Woodward's Gardens. We propose here to give an additional description in general, without, however, going very fully into details.

As regards location, they embrace two squares between 13th and 15th, Mission and Valencia streets, and can be reached from the business part of San Francisco by the Mission or Market St. cars, the former taking visitors directly to the front entrance. The dense hedge of Monterey cypress, some 20 feet high and 400 long, screening this front, is itself an attractive sight.

Its various departments may be summed up as follows: 1. Natural History; 2. Botany; 3. Mineralogy; 4. Art—including Ethnology and Numismatics; 5. Amusements and Entertainments.

These we shall describe, in brief. 1. The department of Natural History includes some of the rarest living animal specimens of quadrupeds, fishes, reptiles and birds. These are kept in fine condition in the open air within strong cages, or roomy enclosures, pits, pens, sheds, aviaries, ponds, running stream and lake, and the marine and fresh-water aquarium, the latter constructed and kept under the supervision of Mr. C. Schuman, and certainly one of the largest and most complete to be found in the United States. This department is also represented by most of the numerous, well prepared and arranged specimens in the museum proper, and in three other buildings. The huge skeleton of a whale which was 75 feet long, is one of the curiosities in the inner garden. 2. The department of Botany embraces many rare and beautiful trees, shrubs, trailers, flowers and grasses, distributed in good taste throughout the finely improved grounds, along the artificial lake and stream, and upon the rock-work, where the large fountain tosses its handsome jets. It includes the conservatory with its neat rotunda, for palm trees, bananas and other tall tropical growth, and the tropical green houses—all well filled with curious and exquisitely beautiful hot-house plants; the fern-house, full of those delicately-leaved, flowerless plants, from the giant forms of which in the early epochs of the world's history geology teaches us most of our coal-beds were formed. There are also well arranged specimens of the coarse and fine grained woods of the Pacific coast in the museum.

3. Mineralogy. This comprises, besides many minerals of the Pacific coast, Prof. Kaderly's large and valuable collection from Japan. 4. Art. This includes—besides many unique and artistically finished structures among the buildings beautiful pieces of marble statuary, placed at various points throughout the grounds and buildings; the attractive art gallery, where the eyes can be feasted with a truly meritorious and varied collection of oil paintings, old and new; also polytechnic hall, to the former attractions of which is being added a large *Zoographicum*, an invention of Prof. F. Gruber, consisting of a wheel over 12 feet high and 24 in diameter, turning on a vertical axis, and displaying with its eight divisions in succession, characteristic and instructive scenes of the different continents, giving Arctic, Tropical, Semi-Tropical, and South Pacific Island views—all studiously true to nature; then the camera obscura, where for a small extra charge, a fine view in miniature can be had of the living, active scene around you, in the gardens and adjoining parts of the city; and finally the sculptor's studio, with its models of the colossal bust of Washington and other figures, a great attraction being that the process of modeling can be witnessed.

The ethnological collection consists chiefly of weapons and other implements from most of

the South Pacific islands, and the division of numismatics comprises numerous coins, medals, and casts of seals, extending from times of ancient Rome to the present.

5. Amusements and Entertainments. These are varied and the best of their kind. Besides daily and special entertainments in the huge pavilion, music hall and restaurant, there are exercises and amusements in the open air. In the first garden is the rotary boat, propelled by oars and three schooner-rigged sails in its pretty circular lake. It forms the outer rim of a huge wheel some 40 feet in diameter, resting on the surface of the water, is itself three feet wide, and will seat about 100 persons. When filled with merry boys and girls, and whirling steadily in its place, on a bright sunny day, it is a beautiful sight. In the second garden, where most of the animals are kept, are swings and gymnastic poles of various kinds, two stylish little carriages drawn by goats, the rare and royal fun of rides on camels and donkeys, and inventions for testing strength. A fine balloon ascension is occasionally made here.

Part of the indoor entertainments are permanent, but many of the exhibitions are constantly changing. The pavilion, built on the highest ground in the first garden, will seat over 5,000 people. The floor of its amphitheater is 90x120 feet and forms a fine skating rink. There daily visitors can get roller-skates and skate to their heart's content.

Saturdays and Sundays and other holidays there are special performances from 1 to 4 P. M. Besides the finest of music by Wetternau's hand and the orchestra, the best troops and special artists that visit San Francisco, including trapeze performers, acrobats, jugglers, rope-dancers etc., are engaged from time to time.

Suffice it to say, that these performances, like every other curiosity in these justly noted gardens, are always the very best known in their several departments.

It is admitted by all that every one, old or young, is the happier and better informed for spending a day occasionally in Woodward's Gardens.

Mining Mortality.

Statistics lately compiled show that of the deaths that occurred in mining in Great Britain between 1850 and 1860, 29.36%, or about one-fifth, were due to fire-damp explosions; 30.87%, or about two-fifths, were due to falls of the roof and sides of the mine; 17.24%, or less than one-fifth, were due to shaft accidents; and 22.53%, or more than one-fifth, originated in miscellaneous causes and accidents above ground. In the first 10 years after the inspection of coal mines was instituted, in 1859, the total number of deaths was 9,090 from all causes, being within 1,000 of the total number of deaths that had before occurred in the entire history of British coal mining. On the face of it this seems either to vitiate entirely the estimate that only 10,000 deaths occurred up to 1859, or to prove that neither the appointment of inspectors nor all the accumulated and valuable resources at the command of the mining engineer have been able to reduce the fatalities among this class of miners. Brought down to a later period British statistics show that during the 15 years ending with 1875, 15,908 lives were lost in raising 1,608,576,193 tons of coal. In that country the ratio of deaths to tons of coal raised were, in 1874, 1 to 133,251 tons; in 1875, 1 to 118,730 tons.

In the Schuylkill coal mines, Pennsylvania, the ratio of death to tons of coal raised were, in 1874, 1 to 66,126 tons, and in 1875, 1 to 86,207 tons, showing the fatalities in the American coal mines to have been nearly twice as great as in the English.

UTAH NORTHERN RAILROAD.—The Spring terminus of the Utah Northern railroad will be situated about six miles northwest of the place where the road crosses Bear river. The Montana freight teams are expected to get their second loads at this terminus, and in the meantime the railroad will be pushed forward into Marsh Valley, to a point where the Montana wagon road crosses Marsh creek, near the southern boundary of the Ross Fork Indian Reservation. Parties who think they can divine the inscrutable purposes of Jay Gould, say that the extension of the Utah Northern is only a scheme to throw cold water, as it were, over the Northern Pacific project, so that Gould may the longer enjoy the Union Pacific monopoly. Hence, the diviners conclude the Utah Northern will be extended only as far as Snake river, at which point the terminus will be fixed, at least for a number of years. If they are correct in their surmises, this Corinne of the north will be on or near the Ross Fork Indian reservation, which fact may result in trouble between the noble red man and his aggressive white brethren. But the military authorities, we are reliably informed, have strongly recommended the removal of the Bannock Indians from this reservation and the restoration of the country, now included in the reserve, to the public domain.—Salt Lake Tribune.

Of the bright har that once practiced in White Pine the Sentinel gives the names of those who have ceased to live, as follows: Ashley, DeLong, Perley, Pitzer, Bryant, Darrow, Foster, Frank and James Kennedy, Graves, Musser, Allen and Simms.

NEW mines have been discovered two miles north of the Red hills, in the Paradise mountains, Nevada.

USEFUL INFORMATION.

Amendments to the Game Law.

The killing of quail, partridge and duck is prohibited in San Bernardino and Los Angeles counties between the 1st of April and the 1st of August; and in other counties except Lassen, Plumas and Sierra, between the 15th of March, and the 15th of September. The killing of doves is prohibited in San Joaquin county between the 1st of January and the 1st of July.

The gathering or destroying of the eggs of any species of wild duck is made a misdemeanor. The killing of any male deer between the 1st of November and the 1st of July is prohibited.

The killing of any antelope, elk, mountain sheep or female deer is prohibited for four years from the passage of the Act.

The killing of spotted fawn at any time is prohibited.

The killing of any animals mentioned in the game laws, except for use of food, is a misdemeanor. This clause is designed to prohibit the poisoning of game animals.

The taking of any species of trout is prohibited between the 1st of November and the 1st of April.

The taking of salmon is prohibited between the 1st of August and the 15th of September, and also between sunrise on Saturday and 12 M. on the following Sunday through the year.

The taking of shad is prohibited between the 1st of April and the 31st of April and the 31st of December.

Fish of any description can be taken at any time with hook and line in the tide waters.

Traps and other permanent contrivances for catching fish in any of the streams or sloughs are prohibited.

Nets may not be used, except for shrimp fishing, with meshes of less than one and one-quarter inches. Nets may not extend more than one-third across any stream or slough.

It is required to return to the water all the young of fish, or fish too small to be marketed.

The penalty of violating any provision of the law is a fine of not less than \$5, nor more than \$300, or imprisonment in default. One-half of all fines collected goes to informers and half to the District Attorney. All nets and apparatus illegally employed may be seized and sold, and one-half of the proceeds will go to the person making the seizure, and the other half to the school fund. All nets with meshes under size will be destroyed.

The Act is already in force.

An Original Metric System.

It seems that Congressmen are doing something on their own hook in the metric line. A bill, introduced by Representative Stevens, of Georgia, to promote the general use of the metric system, authorizes the use of the modified metric system and the continued use of any system permitted by law is not prohibited, the true intent and meaning of the act being not to enforce any particular system, but to provide for the public convenience by adaptation to its circumstances and exigencies, the metric system being capable of indefinite expansion to suit the uses of mankind in business and science. The following are the metric tables as proposed by the bill:

Measures of Length—100 hairs make a nail, 100 nails make a meter, 1,000 meters make a kite.

Measures of Surface—10,000 square meters make a great acre.

Measures of Bulk and Capacity—100 drops make a spoon, 100 spoons make a quart, 100 quarts make a cask.

Measures of Weight—100 seeds make a corn, 100 corns make a nut, 100 nuts make a hi-pound or bip, 1,000 hips make a ton.

MOTHS IN CARPETS.—The carpet moth makes his favorite home about the hindings and corners of the carpet. If this is an ingrain or three-ply fabric, successful war may be waged on him by wringing a cloth out of hot water, laying it over the hindings and edges, and ironing with as hot an iron as can be used without scorching. This will destroy both the moths and their eggs, and after a few such visitations they disappear. But this steaming and ironing process is not effectual with Wiltons, Moquettes, or any heavy carpetings. The heat cannot thoroughly penetrate them, and ironing injures the pile of the velvet. Still, it is best to draw the tacks occasionally, and lay the edge of the carpet over one side only, or a part of a side, at a time—and steam and iron it on the wrong side. Then, beside this, the floor should be wiped as far under as the arm will reach with a cloth wrung out of strong and hot Cayenne tea; and before re-nailing, the binding and edge of the carpet should also be wiped with it, rubbing them hard. Some have recommended sprinkling salt round the sides of the room before nailing down the carpet, but we should think this objectionable, as the salt absorbs moisture from the air and may thus cause too much dampness.

HARNES POLISH.—Take of mutton suet, two ounces; beeswax, six ounces; powdered sugar, six ounces; lamphack, one ounce; green or yellow soap, two ounces; and water, one-half pint. Dissolve the soap in the water, and add the other solid ingredients, mix well, and add turpentine. Lay on with a sponge, and polish off with a brush.

ENGLISH PAPER CARPET.—A description is given of a paper carpet now made in England, and designed to imitate parquet flooring, the paper being printed in patterns to imitate different woods from photographs, so that, as it is stated, the resemblance is absolutely perfect. The floor is first prepared, being made level, and the crevices filled up with plaster of Paris, over the surface, as thus prepared, lession is stretched, and, on this, first lining paper and then the patterned paper is pasted, the whole being finished with a coating of a peculiar kind of varnish, described as wonderfully hard and wear-resisting. This kind of carpeting can be kept perfectly clean with the greatest ease, and though the wear of paper carpeting may be thought problematical, the inventor states that he has had rooms covered with it for 16 months, without showing any appreciable signs of wear. Its appearance also is very satisfactory to the eye.

TO KEEP NAILS FROM RUSTING.—Heat a quantity of them on a shovel, and throw them, while quite hot, into a vessel of coarse oil or melted grease. The nails should not be so hot that the grease will be made to smoke freely. Cut nails prepared in this manner are improved in every respect. They are rendered tougher, and they will outlast any kind of wood, even though hurried in the ground; while unprepared nails are completely destroyed by rust in a very short time. Probably melted paraffine would be still better than ordinary grease, as it forms a very effective coating, penetrating the pores and preventing the access of air or moisture.

SOUTH AMERICAN TRADE.—Already Mr. Fralick, who went to South America as the special Postal Commissioner, has accomplished important results by his trip. He has secured the removal of the freight discrimination of \$14 a ton from Panama to Callao against American in favor of English goods, and he has also concluded an agreement with the Peruvian government for the establishment of postal communication with the United States under the Berné Postal Union.

RAT-PROOF PAINT.—Mix finely powdered glass with pitch or coal tar and rosin, and paint your grain bin with two coats, and it will be too much for rats' teeth. They don't like the tar, and the sharp glass is still more disagreeable.

GOOD HEALTH.

Color Blindness on the Railway.

Much interest has been excited of late by the discovery of an alarming prevalence of color blindness among railway operatives, to which is attributed many of the accidents growing out of inability to distinguish the color of signals. Mr. Thos T. Nelson, optician, of Chicago, makes the following contribution to the literature of the discussion: "From the first I have been accustomed to unite with the subject of color blindness that of quickness of perception, as I found in my experiments that very many not actually color blind were practically so from the sluggishness of their perceptive faculties, and I also found some who were unable to distinguish colors at certain distances, varying more or less in individuals, as well as some who were color blind at night and not in daylight, and vice versa. I have also considered with these defects, under the onegeneral head the optical defect called 'Myopia' generally known as 'near-sightedness,' and another defect called 'Astigmatism,' both or either of which exist to a greater or less degree in a large percentage of population, and in a majority of cases not suspected. Tablets and charts are not entirely practical except for day tests, since the results obtained with reflected light are quite different from those obtained when direct or transmitted light is used, and in practice the most important test in railway service is certainly that which insures the greatest safety at night. There are other questions constantly arising, among which is that of the circumstances under which color blindness may be acquired, but in the absence of records of individual cases kept for a period of time, this must remain a question for further investigation. My facilities for determining to any certainty just what part defective vision has had in railway accidents, has been very inadequate, the reticence of railroad companies upon the subject of accidents not being conducive to thorough investigation; hence I am compelled in a great measure to reason by analogy, but I have no doubt that in many instances of blunders or mistakes which are usually attributed to carelessness or recklessness, where defective vision could enter as an element, investigation would show that it was the prime cause of the accident."

Metal Grinders' Consumption.

A correspondent writes to the Iron Age that nothing is so common among nailers of late years as what is known as nailers' consumption. The rate of mortality from diseases of the lungs, superinduced by dust from the grindstones, is positively fearful. A post-mortem examination, held on the body of G. W. Johnson, of Wheeling, who died a short time ago, which was published in the daily papers, furnished a full description of this so-called 'nailers' consumption.' An attempt has been made in some of the nail manufacturing to prevent dust from circulating by introducing powerful fans, with

a series of pipes by which the dust is carried off through the fans by exhaustion. Now this is all well enough, so far as it goes, but the fans do not, nor is it possible for any known mechanical appliance to remove all the dust; hence sufficient dust remains floating in the atmosphere to kill in a short time persons whose respiratory organs are not of the most healthy and durable character. Most particularly is this the case with nailers. Devices, such as a moist sponge worn over the nose and mouth, fail to prevent the complaint. Our correspondent recommends a false mustache so constructed that it would fit neatly round the outer rim of the nose, extending down below the chin on those who have no beard, or correspondingly to those who have. A slight gum elastic string would hold it on without disagreeable feeling. Any hair not too coarse would answer the purpose. Such an appliance would not disfigure the face, could be easily adjusted, and would save many a poor fellow from an untimely grave. If any one will take the trouble to look at a hair under the microscope, he will see how nature has constructed it for his purpose. A feather is a very good illustration of a hair, with its thousands of barbs all pointing the same way, catching and holding all floating particles that are drawn toward the nostrils by inhalation.

ANTIDOTE TO SNAKE BITES.—On the subject of snake bites, a very interesting communication has lately been received in India from an American gentleman, Mr. Kosciicky, recommending the gall of rattlesnakes as an antidote for snake bite. Mr. Kosciicky, who became acquainted with the antidote at Venezuela, states that it is not only cheap and infallible, but instantaneous and wonderful in its effects; crows and dogs in the last stages of the poison recovering as soon as the remedy was administered to them. The preparation of the antidote is simple: Three rattlesnakes' galls put into an ordinary wine bottle filled with 30° spirits, and allowed to stand for a week. In ordinary cases one or two tablespoonfuls are taken; in extreme cases, three to six. Mr. Kosciicky recommends experiments being made in this country with other snake galls. Dr. Fayrer agrees with this recommendation, and refers Mr. Kosciicky's letter to the committee at Calcutta for investigating snake poison. The idea, however, he says, is not a new one, for in the "Thanatophidia of India" the result of an experiment with the antidote is recorded; and he is of opinion that when brought to the test of scientific investigation, it will not prove more successful than the many other "antidotes" which have hitherto been tried and have failed.

AMERICAN WOMEN.—American women, says Harper's Bazar, take vastly better care of themselves than formerly. They have more acquaintance with hygienic laws, and hold them in far higher esteem. The days when they exposed themselves to dampness and wintry cold, in thin slippers and silk stockings; when they abstained from flannels next to the skin; when they pinched their waist to semi-suffocation; when they sacrificed comfort and health to what they conceived their appearance—these foolish and unhappy days have gone forever, have barely been known to the rising generation. Our women have no mawkish and morbid notions as to themselves; they no longer think that to be unhealthy is to be attractive; that invalidism and interestingness are synonymous; that pale faces and compressed lungs are tokens of beauty. They dress seasonably; they wear thick boots and warm clothes in had and cold weather; they allow themselves to breathe freely, and they find their looks improved, not injured by the wholesome change. There are exceptions—many of them doubtless—but the rule is as we have described, and the exceptions are constantly diminishing. It may be safely said that all sensible women are becoming, if they have not yet become, converts to nature, and that they heed her hehests, recognizing the great principle that what is not natural cannot be beautiful.

SCARLET FEVER BY MAIL.—A medical correspondent of the London Telegraph, a few weeks ago, gave the following account of such a case: "A lady residing in the country wrote to inform a friend in this neighborhood (East Sheen) that she was occupied in nursing her daughter suffering from scarlatina. The friend, after reading and burning the letter, gave the envelope in which it was contained to one of her children to play with. Ten days later I was requested to see the same child, when the diffused red rash over the skin, elevated temperature, and ulcerated tonsils clearly pointed to the nature of the malady with which I was called upon to deal. From inquiries that I have since made, I am satisfied that unless the disease originated de novo it could be traced to no other source of infection than the unfortunate envelope previously mentioned. Preventive medicine is always better than curative. I would therefore suggest that all communications not absolutely necessary written from an infected house be interdicted, and then when received, both letters and envelopes be immediately consigned to the nearest fire."

HOME-MADE COURT PLASTER.—The following recipe comes to us well recommended: One ounce of French isinglass; one pint of warm water; stir till it dissolves; add ten cents' worth of pure glycerine and five cents' worth of tincture of arnica; lay a piece of white or black silk on a board and paint it over with the mixture.



W. B. EWER..... SENIOR EDITOR.

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The Week.

The prosperous season continues. The rains,
which keep the crops growing and add to the
wealth of water for mining purposes, are also
bringing life to trade, and reviving influences
will follow in manufactures. The increased
productive effort naturally calls for materials to
do its work, and we look to busier times and
larger orders in all our wood and metal working
establishments. There is also a better feeling
pervading the community both with regard to
profit from legitimate enterprises and security
for investments already made. The discontent,
which was fanned into flame, among the unem-
ployed element in our population, is giving way
to a more sober tone of thought and action.
The increasing demand for labor is solving
questions which theory do not solve. This will
increase as the season progresses. There will
be a sharp call for laborers, business men
will dispose of their stock and capitalists will
regain confidence. The result, as we foresee it,
will be a firmer feeling in real estate and a
tendency toward improving buildings now
existing and erecting new. This will in turn
sharpen the saws in our forest mills and give a
ring to the hammer of the builder, which will
be heard throughout the State. We shall see,
as never before, that the true growth of our
coast depends upon honest labor and generous
encouragement of legitimate productive enter-
prises. If this lesson shall be well learned
this year it will not be the least valuable gift of
a generous season.

Timber on the Public Lands.

What is known as the timber bill, now pend-
ing in the United States Senate, is designed to
guard the forests on the public domain against
being cut down and used by lumbermen, as
heretofore, without any compensation being
made therefor to the Government, as well as to
preserve these forests against wasteful and
wanton destruction by any and all parties.
Some such legislation as this has for a long time
been needed, and it is to be hoped that the pro-
visions of the bill now under consideration will
be sufficiently stringent to secure the end pro-
posed. This bill allows the free use of all
timber necessary for domestic purposes, such as
farming, mining, etc., upon land not subject to
entry under existing laws, except for mineral
entry, or, in other words, upon mineral lands
belonging to the Government.

There is one feature of the bill, however, that
in its application to some of the mining districts
of the interior might work a hardship. This is
the clause which declares that no timber shall
be cut in the mountain regions within three
miles of the upper edge of the timber, commonly
known as the "timber line."

In so far as the wooded mountains of most of
the country on this coast are concerned, this
provision of the bill, should the latter become a
law, would be inoperative, inasmuch as the
forests extend to the tops of the mountains,
having a lower hut no upper timber line. This
clause has been introduced into this bill for the
purpose of preserving the timber along this
three-mile belt, as a means of guarding against
a too rapid melting of the snow, causing
freshets in the valleys below, this protection of
the snow on the higher mountains tending also
to prolong the supply of water in the streams
descending therefrom. This being its object,
the strips of country to be protected from
denudation should have been the summits of
the mountains, where these are timbered, as in
most cases they are. As most of the forest
lands west of the Rocky mountains extend up
to an altitude of 9,000 or 10,000 feet, there is
little need to protect their upper line against
the depredations of the lumberman.

In some parts of southern Colorado and New
Mexico, it is the case, however, that the timber
does not grow to anything like this altitude,
there being in those regions many mines far
above the upper "timber line." The most of
the mines there are, in fact, situated above that
level, and should the miners be debarred from
cutting timber along the belt proposed for reser-
vation, they would be practically estopped from
developing their claims, as they could not well
haul their wood and lumber up the mountains
for so great a distance. Whatever the utility
of the proposed clause in other cases, these sec-
tions of country ought to be excepted from its
operation, the forest here being, as a general
thing, much scattered and affording but little
protection to the snow.

We do not think there is much force in this
argument anyhow, and in our own experience
know of but a single instance where a reser-
vation of this kind would be of much practical
advantage, and in this instance there is no up-
per, though there is everywhere a very sharply
defined lower "timber line," we allude to the
easterly slope of the Sierra Nevada, or at least
that portion of it that is being stripped of tim-
ber to supply the Washoe miners. The denuda-
tion of the mountain here allowing the snow
to melt more rapidly than it otherwise would
have done, thereby causing freshets in Carson
river during the early summer, and leaving it
with less water than it formerly carried later
in the season, to the great detriment of the
mills dependent upon that stream for their pro-
pulsive power.

There is one peculiarity of the principal
mountain forests on this coast that in the con-
sideration of this question of timber preserves
has not been kept sufficiently in view—and that
is their wonderful power for self-renewal. The
coniferous tracts of the entire Sierra Nevada,
when stripped of their timber, are at once cov-
ered with a vigorous growth of young trees,
which, when protected against fire and other
destructive agents, come along so rapidly that
they are large enough to be cut for saw logs in
the course of 25 or 30 years, yielding meantime
immense quantities of posts, poles and firewood
under the thinning out process, for they grow
up so thickly at first that many, unless cut out,
must necessarily die before they reach any great
size. However much we may require tree
planting elsewhere, nature will attend to the
work of forest reproduction in these mountains
if only we give her a fair chance to do so.

BANK OF CALIFORNIA.—At the last meeting
of the Directors, Hon. William Alvord, on
resignation of Mr. Mills, was chosen President
of the Bank of California. The selection is
eminently a proper one. Mr. Alvord has served
the bank well as Vice-President. He has dis-
charged, with great credit, several high public
trusts which have been committed to him by
the citizens of San Francisco. He is a man
whose integrity is unquestioned, whose ability
is universally recognized. The bank has done
well for itself and for the community in its
choice of President.

It has been decided by the courts that a ma-
chine temporarily disused under circumstances
connected with the supply or demand of its prod-
uct, and independent of the efficiency of the
mechanism is not an abandoned experiment.

Better Take to Mining.

More of our young men and boys should be
trained up for mining pursuits. This, when
rightly followed, will yet prove to be the best
business on this coast. It will hereafter be at-
tended with fewer failures, for the reason that
there will be fewer mistakes than have charac-
terized it in the past. The experience of a gen-
eration will insure for it in the future more cer-
tain as well as larger average rewards. It is a
business that should prove attractive to our
youth. There is in it enough of exertion and
excitement to gratify the fondness for action and
the love of adventure natural to the young,
while in its large possibilities the chances for
making money are especially good. To qualify
a young man for pursuing this calling in a suc-
cessful and intelligent manner demands less
time and money than would be required to fit
him for any of the mere mechanical vocation,
and not half as much as would be necessary to
prepare him for either of the so-called learned
professions.

While it is true that the more education he
has the better, it is still the case that the miner
can get along with a comparatively small
amount of book learning. Suppose a lad any-
where along from 16 or 18 to 25 years of age to
have a common school education, if it is in-
tended to make him a miner, let him first take
a course of lessons with a good practical as-
sayer, learning how to assay for all the more
common metals, and also the use of the blow-
pipe thoroughly. If afterwards he has the time
and means to follow this up with a course of
lectures in chemistry and mineralogy, so much
the better. But if not, let him now go forth
into the mines provided with a miniature assay-
ing apparatus, or a blow-pipe, at least, and en-
gage in prospecting. If his necessities are such
that he must earn something from the start,
then let him go to work as a common miner.
While working for wages he will gain a prac-
tical knowledge of this most essential branch
of the business, enabling him to do it himself, and
to judge when it is properly done by others.

With his ability to test ores he will be all the
while exercising himself in that way, the ex-
perience of the older miner, with his practiced
eye, being of great service to him in learning
the geology of the various formations and in
enabling him to readily detect the presence of
ores and such other signs as are apt to arrest
the miner's attention. The young man so
qualified, even if he have to work for wages at
the outset, will not be long in advancing him-
self to a more responsible and better paying
position, and finally acquiring proprietary in-
terests should he feel inclined to do so.

If he can assay well and have the necessary
outfit, he will find many opportunities for doing
the assaying for large companies as well as for
establishing himself in the business at some
active mining center and doing custom work.
If he follows the life of a prospector then the
advantages of being able to test such rocks and
ores as he may come across are too manifest to
require any argument, the blow-pipe alone in
the hands of an expert, being ample to deter-
mine the character of samples in the field with
sufficient exactness. The entire cost of such a
course of instruction as is here indicated, with
necessary outfit, would not exceed two or three
hundred dollars, the instructions along not
more, perhaps, than a hundred, the time re-
quired being from two to four months. There
are a number of first-class assayers in this city
who hold themselves ready to give instructions
in this art and who are too careful of their own
reputation to suffer their pupils to leave with-
out being well up in their calling. The busi-
ness places of some of them can be found by
looking over our advertising columns.

Printing in the Patent Office.

We have received a circular from the U. S.
Patent Office, making an announcement that as
the appropriation made by Congress for printing
and binding for the Patent Office has been ex-
hausted, the *Official Gazette* will not be issued
as usual for a while, and the printing of speci-
fications has also been suspended for the same
reason. The suspension will probably be only
temporary, as a deficiency appropriation bill is
now pending before congress.

In view of the fact that the Patent Depart-
ment of the Government, which is financially
productive, and in truth the only one which is
self-sustaining even, it seems rather unjust that
its business should be suspended for want of
money. Not that there is no money either,
because the department has nearly a million
dollars surplus earnings tied up with red tape
somewhere which is "not available."

It is most assuredly due to inventors of the
United States, to whom a great deal of our
prosperity is attributable, that the business of
the Patent Department should move smoothly
and not be retarded by legislation in any way
whatever. Matter accumulates so very rapidly
that when the printing once gets behind, it is
extremely difficult to catch up again. All this
works hardship to inventors who pay their
money into the office and expect something for
value received. We hope that such a thing as
this will never be allowed to occur again, but
probably all we can do at present is to relieve
our feelings by a slight grumble at the powers
that be.

American and Foreign Labor.

This distress among the working classes in
certain parts of the United States is looked
upon by many as in some way the fault of the
country or its legislators, although they have
only to look elsewhere abroad and they will see
the same condition of affairs. The iron work-
ers and colliers of the north of England and of
South Wales, and the miners of Cornwall are
all in a deplorable condition. France is not
suffering quite so severely, but her working
people have very little to be satisfied with in
their surroundings. In Belgium wages are low
and employment scarce, and in Germany trade
has been more or less depressed ever since the
war.

Regarding the causes of the distress of the
laboring population in England the London
Mining World says that furnace after furnace
has been put out of blast, colliery after colliery
has been shut down, and as for the tin and cop-
per mines that have ceased to work in Cornwall,
their name is legion. No adequate effort has
been put forth to relieve these people except in
individual cases.

No better idea could be furnished to the state
of matters than the few following figures which
we quote from the *World*: "Whereas common
engine coal in 1872-3 fetched at the pit's mouth
7s. 6d. per ton, to-day we question if it realizes
so much as 2s. 6d. Ordinary pig iron bars at
the works sold in 1872-3 for 6l. and 7l. per ton,
which now only realize some 45s. or 50s. Staf-
ordshire hars also, which in 1872-73 realized
16l., hardly fetch half that now, whilst the best
Bessemer rails, which realized 16l. 10s. per ton
in 1872-3, are hardly realizing 6l. 10s. to-day.
Under the great reduction of wages which these
prices have entailed, and when we remember
that so many works have been closed altogether,
it is not surprising that there is such acute dis-
tress prevailing over so large a portion of our
country."

Notwithstanding these facts, the *World* thinks
the English working man may congratulate
himself on his position as compared with that
class on the continent. Here we have still
further cause for congratulation, for there is a
large area of territory still uncultivated, thou-
sands of acres of mining land still unprospected,
and if our laboring classes choose to avail them-
selves of the opportunities offered to them out
of the cities, they will always be able to find
an opening.

The Savage.

Last Saturday, the east drift, being run on
the 1640 level of the Savage mine, passed first
into a very soft, favorable character of porphyry,
then a heavy clay wall, three feet in thickness,
beyond which a vein of good clean ore, but lit-
tle mixed with the surrounding material, was
encountered. The drift was driven into the
ore three feet, the ore showing the entire width
of the drift. Drills were then driven into the
ore four feet further, showing it to be about the
same as what was in sight.

This, says the *Gold Hill News*, is an entirely
new ore discovery and lies east of any prospect-
ing ever done in the mine below the 1300 level.
On the 1600 level, Mr. Lon Hamilton, while
Superintendent of the mine, two or three years
ago, ran a drift 250 feet east from the north
and south lateral drift, at a point 200 feet south
of the Gould & Curry line, but did not reach
the range of the new development by at least
300 to 400 feet. The new vein has a course 23°
east of north, and as nearly as can be deter-
mined by the little work that has been done on
it, a dip of about 60° to the eastward. The ore
is the genuine Comstock sulphuret, the quartz
being of the liveliest and healthiest character.
It assays from \$15 to \$100 per ton and will
probably average \$40. The drift was at once
stopped, and General Williams, the President
of the company, was telegraphed in San Fran-
cisco, but he being too ill to come up, Superin-
tendent Gillette has gone to San Francisco to
receive instructions what to do. The drift, in
the meanwhile, is being enlarged and timbered,
preparatory to starting drifts both north and
south along the west side of the ore vein.
When these drifts have reached a proper dis-
tance, crosscuts will be run to ascertain the
width and value of the ore. As soon as these
drifts are fairly started it is likely that the
main east drift will be again advanced. The
east drift on the 2000 level is still drifting vig-
orously forward, the face in a much softer,
kindlier character of porphyry than it has be-
fore encountered since it was started. It is
believed that this drift will not have so far to
run eastward as that on the 1640 level to strike
the new vein, as the slope of the main incline
to the eastward is very rapid.

THE SUTRO tunnel is steadily advancing from
the eastward toward the heart of the Comstock,
and in a few months or weeks must be met by
the drift east on the 1640 level of the Savage,
which is being run for the purpose of meeting
the Sutro tunnel, as well as of exploring the
ground of the company in that direction.

THE connection between the Yellow Jacket
and Crown Point mines on the 2000 level has
been completed. This is a very important con-
nection, giving much needed ventilation, and
greatly improved facilities for working both
mines at that depth.

Notes on the Black Hills.

From an intelligent and reliable mining expert, who, after a somewhat protracted stay, has just returned from the Black Hills, we obtain some information in regard to the mineral deposits and the industrial aspect of affairs in that region. As our informant confined his observations to Deadwood and vicinity, our remarks are to be accepted as applying to that locality mainly. Summarizing this information, it appears that the strong features of this section of the country consists in the large quantities of low-grade gold-bearing quartz that can here be mined and milled at a comparatively low cost. This quartz, a pure silica, bears a dark reddish tint, resembling that found at certain localities in California. The dominating mineral belt of the district, which is made up wholly of this material, bears generally north and south, shows strong surface exposure, and is clearly traceable at this point for a mile or more. At some places along it this lode has an ascertained width of over 200 feet, and nowhere is it less than 50 or 60 feet across. While its transverse dimensions have not at any point been fully determined, it will probably be found, when thoroughly exploited, that it has, as a whole, an average width of not less than 150 feet.

The deepest explorations yet made here are on the Father de Smet claim, which has been sunk upon to a depth of 175 feet, and cross-cut for a distance of more than 200 feet, the excavations made being wholly in ore. In this mine, what is considered the east country, a talcose rock, has been reached, but nothing looking like a wall has yet been encountered on the west.

After extensive milling operations it is found that this ore, taken out in bulk, and without assorting, yields under the stamps from \$7 to \$15 per ton—or, taking a more narrow range, from \$8 to \$12, a fair average being about \$10 per ton. The gold occurs in the ore free and can be saved up to a close percentage by the most cheap and simple methods of reduction employed in California. The cost of milling and mining the ores here will not, for the present at least, exceed five or six dollars per ton. Should the cost of extraction and the difficulty of treatment be hereafter increased, this will be more than offset by the reduced prices of supplies and labor. While the early occurrence of such difficulties is not apprehended, the cost of labor and material must very soon undergo a marked reduction, prices of everything coming down to the Eastern standard. Just now the prices of labor are rather high, owing to the cost of subsistence; nearly everything required for the sustenance of the population, after long railroad carriage, being subjected to more than 200 miles of expensive wagon transportation. The latter, however, it is expected will be superseded in the course of a year or so by the construction of the narrow gauge railroad now in contemplation from Cheyenne to Deadwood. The only class of laborers from this Coast who would stand much chance of getting employment at fair wages, or he likely to feel at home in the Black Hills, would be underground miners, very few of the newcomers from the East being sufficiently expert at timbering to answer well in this department of the business.

While the mines on the main mineral belt at Deadwood will no doubt prove to be good paying properties, and others, perhaps, equally good will be found elsewhere in the country, there will open here beyond any question a broad and prolific field for wild cats; the prospectors, swarming like locusts, being bound to take up everything bearing the remotest semblance to a ledge, however far from wood and water, or however worthless.

Of the prospects for placer mining in that region, our informant entertains but a moderate opinion. The gulches about Deadwood are already pretty well exhausted. There are banks of auriferous gravel of sufficient extent to warrant the undertaking of hydraulic washing, some operations in which are contemplated. The most serious trouble threatened in this branch of mining, will be lack of sufficient fall to prevent the troublesome accumulation of tailings. Several parties, among them a strong California company, have projected ditches to bring in water for hydraulic purposes, some ditches having already been constructed for this and other objects. The water about Deadwood is hardly fit for drinking, or other domestic uses, that running in the gulches being contaminated by the dead timber about their sources, and the tailings from the quartz mills. A ditch is being built to supply the inhabitants with a purer article.

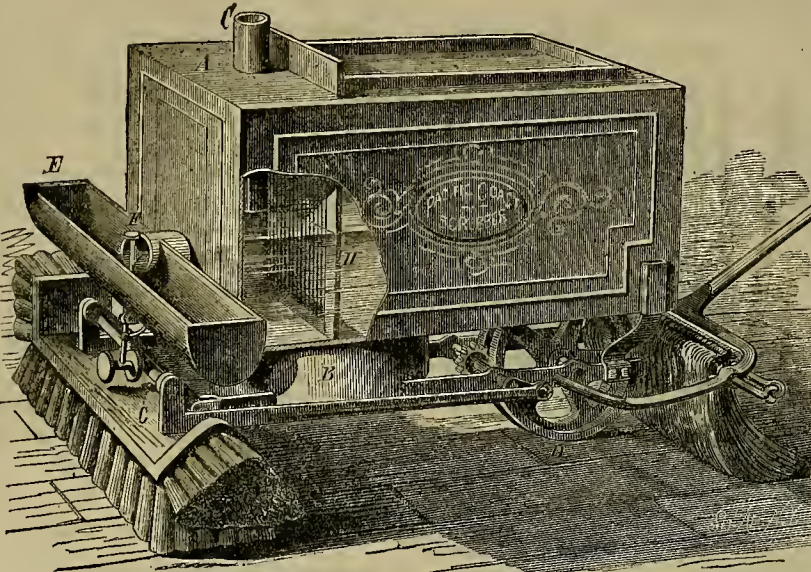
From the foregoing it will be seen that there is not much in this Black Hills region to commend it to the favorable notice of the average California miner. It costs something over \$100 to travel from San Francisco to Deadwood, the mining center of that country. The cost of living there is great; labor, with the exception mentioned, is not easy to be obtained at any price, and the rate of wages will soon be reduced below the California scale. Though the present has been rather a mild one, they usually have severe winters there—deep snow with strong winds and intense cold. They had in the latter part of March a heavy fall of snow, accompanied with such gales of wind as are experienced only in the higher mountains of California. The summers are hot with much thun-

der and lightning, the climate, from all we can gather, being one not at all likely to suit those who have long resided on the Pacific slope of the continent.

Railway Brakes in England.

We see by an item in *Iron* that the Amalgamated Society of Railway Servants has issued an appeal to Parliament and the public setting forth certain grievances of theirs, the principal one being that their lives are endangered by the companies delaying to an unreasonable time the application of continuous brakes. For want of these, minor collisions frequently occur, but attract no attention from the public unless several lives are lost. The railway servants engaged in working the traffic of the lines number 120,000, but as there are in the two houses of Parliament some 176 railway directors, the majority of whom can hardly be counted on as supporters of any movement to carry into effect the recommendations of the Royal Commissioner, made to Parliament over a year ago. Parliament is not likely to help the railway servants much.

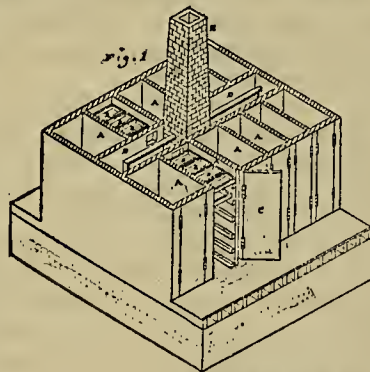
It seems somewhat strange to us here to find,



STOCKLEY'S IMPROVED SCRUBBING MACHINE.

after it took so long for the English railway people to make up their minds to use the air brake, that they should be considered so essential that the men protest against working about the trains without them. It is strange, moreover, that having found out their efficiency, these brakes should not be universally used. The reason, probably, is that the directors are too parsimonious or the roads do not pay. This is no excuse, however, in the minds of the English people generally, and it is probable now that public attention has been called to the

supply of water, which escapes in divided form upon the brush, may be regulated. To the handle of the apparatus is secured a clamp for holding mop rags or cloths, as shown. When the machine is set in motion the valve, *F*, is opened by a nut on the short arm of a vertical rod striking against the shaft, *G*, as it reciprocates with the brush, and water from the tank is admitted to the sprinkler. A spring closes the valve when the machine is not in motion. A filter, *H*, serves to remove all dirt from the water as it passes to the supply pipe, and the



BLOWERS' PATENT FRUIT DRIER.

grievances of the railway employees, the directors will have to remedy them.

COPPER PRODUCT IN CHILE.—Mr. Henry Sewell, M. E., writes us as follows: "When I published the letter entitled the 'Future of Copper Mining on the Pacific Coast,' I stated therein that Chile, in 20 years, had produced values in copper as much as the Comstock had in silver and gold. In the *New York Engineering and Mining Journal* of last week the yearly and total production of copper in Chile for the last 20 years is given, the average being 43,000 tons of fine copper per year. The average price for the last 20 years has been \$400 per ton; equal to \$17,200,000 per year, making for these 20 years \$344,000,000."

CAPTAIN ARTHUR, of H. M. S. "Vernon," has reported to the Admiralty that a diver who was recently employed in moving some ballast, called out "pull me up" through a telephone just before he fainted. He did not signal with the rope but was heard through the telephone which he thanks for his restoration.

An Improved Scrubbing Machine.

The apparatus herewith illustrated is an invention for scrubbing and mopping floors, recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by Dr. A. F. Stockley. This new household implement is self-acting, the operator having merely to propel it. It heats its own water, projects the same in spray form, works a scrubbing brush, and finally applies a mop or wiping cloth.

A is a water tank of any desired size, the top of which is closed by a suitable cover, and which is mounted on a truck. Underneath is a box, *B*, in which the lamp or stove for heating the water is placed, the chimney passing through the tank and protruding above at *C*. At the front end of the frame is the scrubbing brush, to which a quick reciprocating scrubbing motion is imparted by the rock shaft, levers, and other simple mechanism, actuated by a pinion which gears with the wheel, *D*. This brush is so placed that it receives the entire weight of the front part of the machine. Connected with the forward end of the tank is a horizontal sprinkler, *E*, in the pipe leading to which is a valve, *F*, by means of which the

Mr. Blowers' Drying House.

The success gained by Mr. R. B. Blowers, of Woodland, Yolo county, in the manufacture of raisins which lead the market, has created a wide interest in his arrangements for drying. Last year we gave quite full descriptions of his methods and his own account of his success in producing a first-class raisin by using sun-heat if it was available, and if not, by putting the grapes through his drying house. It was also shown how he used the heat of the sun during the first stages of drying and finished the raisins by artificial heat. The fact is he has succeeded in producing a raisin by artificial heat which is so indistinguishable from his sun-dried, that they were all accepted together by the parties to whom he contracted the season's yield. He told these parties that they were only in part sun-dried, but they discerned no difference in them.

Mr. Blowers has used his drier for two years, and assures us that in that time he has cleared, above all expenses, more than three times its original cost, in drying raisins alone. His drier, including house, 42 feet square, with basement, furnaces, 16 drying rooms and 5,000 trays, having 19,584 square feet of drying surface and holding over 30 tons at one time, costs \$2,500.

Mr. Blowers has secured patents through the MINING AND SCIENTIFIC PRESS Patent Agency, and the small engravings on this page will give an idea of the construction of this drier.

Fig. 1 is a perspective view, showing the draft chimney, *E*, in the center, on the right and left of which are the furnace rooms, *D*. On each side of the furnace rooms and abutting on them are the drying rooms, *A*, taking the hot air from them at the top and again part way down (not shown in the cut); the door, *C*, is shown open, and the trays, *B*, arranged on cleats.

Fig. 2 is a transverse section taken across the heating and drying chambers. The right side shows the transom, *J*, open, and a lateral and downward moving current of heated air passing laterally in the flues (the flues being made by the solid bottomed trays, placed side by side on cleats), the downward movement being at the alternate ends of the flues, as shown by the cut. The air finally passes through the trap door, *L*, into the flue, *M*, thence into the draft chimney.

The left side of Fig. 2 shows the lateral and upward current. The downward moving current is used for fruit, vegetables, etc., and both upward and downward current for lumber. With this arrangement, it will be seen, an uninterrupted current of air is secured. In the first way with a downward pressure, drying the fruit on the trays thoroughly without turning, and in the second way with an upward pressure, drying lumber alike on both sides. It will also be seen that one room or up to 16 can be built on the same principle, but not with equal cost per foot of drying surface.

We have, in an article on the subject last year, so fully described Mr. Blowers' process of raisin drying that we need but allude to its advantages at this time. Like most all driers hot air is used, but in this, owing to the peculiar construction a very strong draft is secured, enabling him to dry in large quantities without condensation of moisture on the fruit farthest from the furnace. The result is that raisins retain the grape bloom. The capacity of the drier being very great, there is no necessity of dipping the grapes in lye or other preparation, to facilitate drying, and thereby injuring the bloom and aroma of the raisins. One feature in favor of the Blowers evaporator is that the grapes are picked on the trays in the vineyard and removed to the drier without further handling the fruit. Thirty tons can in this way be placed in the evaporator in one day. When the drying process is complete they are packed ready for market directly from the trays and are consequently unbroken on the stems, and, therefore, more salable.

Mr. Blowers has received a group of medals and rewards for his raisins and his apparatus, and his success in his raisin-making efforts has brought him both fame and profit.

REPORT OF THE UNIVERSITY ALUMNI.—We have received a copy of the able and very truthful "report on the practical character of the instruction given and benefits conferred by the University of California." It was made to the Alumni Association by a committee consisting of graduates Arthur Rodgers, Frank S. Sutton and E. A. Parker, who were appointed to examine and report for the information of the alumni. The report will strengthen the popular regard for the institution, because, abating the love and loyalty which alumni have for their alma mater, none are better able to judge of the practical benefits of an institution than those who have carried its influence with them into the walks of life. The report makes proper allusion to the college of agriculture, and bestows merited credit upon its wise and zealous promoter, Prof. Hilgard. We hope the report will be widely circulated and we may find space to present its points more fully hereafter.

The Bessemer medal of the Iron and Steel Institute of England, has been presented this year to Professor Turner, of Leoben.

mop clamp can be adjusted to either side of the handle arms, so as to run close to the side of the floor or surface which is being cleaned. The brush may be of any suitable size, shape or material.

This new household implement will be found very useful where large floors are to be scrubbed, in rooms or halls. The inventor, Dr. Stockley, is at present in this city, at 429 Bush street, where he may be addressed for further information.

PRINTING INK.—We hear cheerful testimony to the excellence of the printers' ink furnished us by Chas. Eneu Johnson & Co., of Philadelphia and New York. It is elegant material and may be fairly classed with the improvements which we made on our paper during the last year. Most files of newspapers will not stand the test of time, but turn yellow and show the spread of poor ink. This we escape by the quality of the ink we are using. We have uniformly good ink at fair rates, and this contains a hint worthy the notice of other publishers who may not be equally well served.

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Copp's Hand-Book of Mining Laws.

Henry N. Copp's hand-book of mining laws, just issued, contains the United States mining laws and instructions thereunder, a digest of decisions, forms, list of mining patents issued, etc. The digest of decisions alone is a very valuable thing, giving, as it does, in brief form, all the decisions of the Secretary of the Interior and Commissioner of the General Land Office in relation to mining matters. These are all under proper headings for easy reference. Forms are given for notice of location, proof of labor, notice of forfeiture, miners' lien, application for survey, patent, etc., affidavit of improvements, etc. There is also a list of patents issued for mining claims from July 20th, 1866, to August 1st, 1877. The book is of pocket size and very convenient for all who are interested in mines. It will be sent post-paid for \$1, on application to Dewey & Co., 202 Sansome street, San Francisco.

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Continued from page 245.

putting in a windlass. The usual amount of 10 tons of ore is being daily extracted.

BAY STATE.—This mine is being worked to advantage and is looking well. They have made arrangements to commence shipping ore to the American Flag mill this coming week. Quite a lot of ore is on hand and good returns expected.

NATIONAL.—Will commence work on this mine about the first of May, as it will take until that time to prepare for work.

TEMPEST.—Are still sinking on this mine and making a good showing. Have reached a depth of 53 feet.

MAYFLOWER.—Have commenced sinking the main shaft of the incline again; intend sinking it 200 or 300 feet deeper.

Arizona.

MILLS RUNNING.—*Enterprise*, April 6: Mining matters throughout the Territory are in a very healthy condition. Mohave county's three mills are all the time producing bullion. Her Hackberry and Mineral Park mills will, in a short time, be running on rich ore. Yavapai county has four mills pounding away, and others that are being prepared for work. Maricopa has several mills running. So has Pinal county. Pima and Yuma counties are not behind, in the matter of mining development.

PECK MINE.—Mr. Robert Archer, who left the Peck a couple of days ago, says that the work of milling and mining was progressing in a satisfactory manner.

THE EMPIRE mine, near Ash creek, about 30 miles east of Prescott, which is owned by J. A. Lawrence and Jos. Chaudowine, is one of the best mines in that section. Mr. Blake today made four assays of rock from different parts of the ledge, which yielded as follows: \$973.95; \$197.91; \$182.20, and \$333.02; all silver. The owners have now a shaft 20 feet deep, which they are going to sink deeper. The ledge assays well for a distance of over 800 feet from the shaft. They were, this morning, offered \$12,500 for a one-half interest in the property, which offer they refused.

Colorado.

SPANISH BAR.—*Denver Tribune*, April 10: The late bad weather and mania for prospecting have retarded work here for some time past. A new cylindrical furnace, made of boiler iron, is proving very successful in desulphurizing and chloridizing the difficult ores of the district. Gulch mining will soon start up. The late excitement at Silver creek has about subsided. A number of mills are running here successfully and others are being fitted up and will start soon.

CLEAR CREEK.—Work on a large number of mines is being actively prosecuted in this district. Many of the ledges here contain a streak of ore from six to 15 inches wide, that carries high-grade ore, much of it yielding from \$100 to \$400 per ton, the most of it being milling ore. From five to 20 men are employed in each mine, the workings ranging, as a general thing, from 50 to 300 feet in depth. A very prosperous season is expected here, as the ore bodies have a permanent look and the rich ores carry developments forward without the aid of outside capital.

Montana.

MOOSE CREEK.—*Madisonian*, March 30: We shall all be disappointed if there is not more money taken out of the Moose creek mines this summer than has ever been before in one season. This lease on the Harvey & Day lode has expired. The parties who have been working it have a fine pile of ore on the dump. It is rich and will mill way up in the hundreds to the ton. The Only Chance lode, at Highland, is looking better than ever before. The "Official" is working his men on the Placer Patent as usual, with good prospects. The snow is two feet deep on the level, and the "Old Tar" says it measured 14 feet in a prospect hole a few nights ago.

PONY.—This camp has gradually dwindled to an almost insignificant number and illy compares with the crowded streets of one year ago, but those left can well be counted the bone and sinew of a once would-be big burg. Butte is now seldom spoken of and those who are left are contented with the general outlook of things and are ready to go "dead broke" on the prospects of Pony yet making one of the best towns in Montana.

Utah.

FRISCO DISTRICT.—*Salt Lake Tribune*, April 6: The Frisco reduction works start up again in a few days, with plenty of water. Both smelting companies are running finely and making 22 tons of high-grade bullion per day. This bullion will grade from 180 to 270 ounces of silver per ton, with a million tons of rich ore in the Horn Silver mine yet to be taken out. Two more leaching companies are about to commence operations. The Albion reduction works send their first silver brick to-day.

PARK CITY.—The Ontario company are grading for their new hoisting works. As far as explored in the 500 and 600 levels, the Ontario vein shows a width of about five feet of high-grade ore, which seems to grow somewhat hazy as depth is attained, but it unquestionably increases rapidly in value. It has been averaging heretofore about \$105 per ton, and in the lower levels will work about \$120 per ton of 2,000 pounds. The mill keeps steadily on rolling out its \$6,000 a day in bars, about 720 fine.

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING, APRIL 20.

UTILIZING POWER OF WATER IN PIPES.—John C. Estey, S. F.
MARSH SHOES.—Robert K. Jordan, Oakland.
SPIRAL SPRINGS.—George E. Gray, S. F.
ANTI-FRICTION BEARINGS FOR JOURNALS AND AXLES.—Thomas H. King, S. F.

News in Brief.

THEY want a mint at Denver.
THERE are 26 active gold mines in Georgia.
TEN Texas stock-raisers own 1,023,000 head of cattle.

RAILROAD building is being vigorously pushed in Oregon.

THE hay harvest has commenced in Los Angeles county.

THE railroad between Benicia and Suisun is completed.

THE famine in the northern provinces of China is increasing.

FRANKLIN, Ind., has an eight-year-old murder case on the docket.

GOLD is now received by Central City banks, Colorado, at par.

FIVE HUNDRED Chinese arrived in San Francisco on this last steamer.

TEXAS has 57,502,240 acres of public land subject to location.

THE worthless poplar forests of Maine are being converted into paper.

THE police force in San Francisco is to be increased from 150 to 400 men.

SPRING CREEK, near Lodi, Wis., has been stocked with 30,000 California salmon.

KANSAS has set her mark at 20,000,000 bushels of wheat as the State product for 1878.

THERE are evidences for some improved demand for skilled labor in the Atlantic States.

EDWARD MIDDLETOWN ALMONTE, first clown of Barnum's circus is dead, of quick consumption.

THERE are still 400,000 sheep in Los Angeles county as the remnant of last year's drouth and disaster.

TWO-THIRDS of the iron furnaces in Pennsylvania are in full blast. A year ago two-thirds were idle.

A KANSAS paper estimates that at least 4,000 people per day are arriving in that State to settle.

THE prices of lodging and entertainment of all kinds will be greatly advanced in Paris during the Exposition.

FIVE HUNDRED bricklayers struck in New York last week, to enforce the Union rate of wages—\$2.50 per day.

WM. M. TWEED, boss of the Tammany ring, died in the New York Ludlow street jail, on the 11th inst., aged 55 years.

ALLEN CROFT, the most desperate of Kentucky "moonshiners," has been captured. He has defied the Marshals for years.

A NUMBER of members of a colony from Germany to Venezuela have arrived at New York in a pitiable condition, the venture having proved disastrous.

At the Central Pacific railroad shops at Sacramento, work has commenced upon 300 flat cars for general use and 12 passenger cars for the Oakland trade.

THE Diaz government has been recognized by our Minister to Mexico, re-establishing full official relations between the United States and that country.

THE Supreme Court of Nebraska has decided that dealing in grain options in Chicago is gambling, and all contracts made in that State are invalid in law.

EX-GOVERNOR PACHECO, while out in a boat the other day, near Angel island, captured with the lasso a large deer swimming for the island, just as it gained the land.

THE hounty installment of \$100 per month to J. W. Marshall, the discoverer of gold in California, has been discontinued, the Legislature refusing a further appropriation.

THE Ladies' National League meeting, which organized in New York, the other day, to operate in behalf of the Indians, consisted of six women, four men and three reporters.

THE cotton masters of Lancashire have agreed to support each other in the event of isolated strikes against a 10% reduction of wages, until trade is stopped or the strike terminated.

TREASURY officials say Secretary Sherman's contract for the disposal of \$50,000,000 4% Government bonds will settle the question of the resumption of specie payments, on the first of January next, as provided by law.

DURING the severe storms that occurred in the State of Colorado in March, 25,000 sheep, 15% of the entire number in the country perished, besides several thousand head of neat cattle.

THIS year's crop throughout the great wheat-growing regions of the northwest, will average one-half more than last year, the prospect for the wheat crop being better now than for the past 17 years.

THE *Daily News*, a one-cent paper, has been started in this city.

THE Carson Mint began the coinage of the new silver dollar on the 15th.

THE Lowell (Mass.) mill owners have given notice of a reduction in wages from 5% to 15%.

ALREADY the heirs of Brigham Young and the Mormon church are in the courts, fighting for his estate.

A LITTLE son of Clarence C. Hickok, was drowned last week at Grand island, Colusa county.

THERE is danger now of a general rising of the native tribes against the British government in South Africa.

JUDGES HOFFMAN and SAWYER have decided that the cubic-air ordinance is perfectly constitutional.

To date 15 Molly Maguires have been executed in Pennsylvania, the murders for which they were hanged being six.

On last Thursday, Charles Nash was bitten by a rattlesnake at San Jose, and came near losing his life in consequence.

THE sum of \$32,000 cash was last week paid for 2,000 acres in Colusa county next the foothills and five miles south of Stoney creek.

JOSEPH CALLAGHAN was run over by a street car in this city on the 16th inst., and mangled so badly that he died in a few minutes after.

A GIRL named Brush committed suicide in Round Valley, Mendocino county, by taking poison. No cause is known for the rash act.

OWING to the inundation of the strawberry lands last winter in the Santa Clara valley, not more than half a crop is expected this season.

CAPT. PIERCE and four men were drowned, on the 11th inst., while attempting to cross the bar in two small boats, at Newport, Los Angeles county.

THE transit of Mercury, which is to occur the 6th of May, will be visible all over the United States, and seven hours and a half will be consumed in the passage.

THE Commissioners passed through Healdsburg a few days ago, on their way to stock the streams far above. They are soon to stock Russian river with Eastern catfish.

THE times for the surrender of the Cuban insurgents having expired, active operations will commence in the Eastern Department against Maceo and a few more chiefs who are still under arms.

THE Northwestern National Bank of Chicago has advertised that it will redeem in gold all of its circulating notes that may be presented. It is the first of the National banks to take this step.

THE war in South Africa is likely to become serious. There has been continuous fighting in the Pirie Bush for a week. Four British officers were killed. The situation in Transvaal is very serious.

In an altercation in a St. Louis saloon on Sunday last Timothy Ryan struck his opponent, Hugh Gormley, a tremendous blow on the neck under the ear with his fist, killing him almost instantly.

A CHINAMAN made his appearance in Leadville, Colorado, a few days ago, but left at short notice upon being interviewed by a committee of miners. This is the third time John has failed to get a foothold in that section.

JEANNETTE LAMERCHT, aged 67 years, rendered temporarily insane from the death of her husband, threw herself under the locomotive on the Oakland Point railroad and was completely headed.

CORTLAND WOOD, aged 65 years, at one time a member of the firm of Wood & Congdon, engaged in extensive mining operations at Murphy's, Calaveras county, killed himself in this city on the morning of the 13th inst., by a pistol shot through the head. Supposed cause, poverty through failures in business.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

GLOBE CITY CON. M. Co.—April 4th. Location, Arizona. Capital stock, \$10,000,000. Directors—R. D. Hopkins, A. W. Robinson, T. S. Atherstone, S. A. Buckingham and B. S. Kellogg.

AJO COPPER M. Co.—April 5th. Location, Arizona. Capital stock, \$10,000,000. Directors—Thomas Wallace, J. White, W. M. Rockwell, Charles A. Morse and T. J. Owens.

GROVE M. Co.—April 5th. Capital stock, \$10,000,000. Directors—Charles Clayton, Silas Selleck, R. M. Gibson, W. H. Douglass and S. M. Brunner.

JUPITER DEEP BLUE H. G. M. Co.—April 7th. Location, California. Capital stock, \$5,000,000. Directors—Frank Cummings, W. A. Keffer, R. A. Lloyd, J. D. Whitney and George C. Randall.

THE GLOBE CITY CON. M. & M. Co.—April 15th. Location: Arizona. Capital stock, \$10,000,000. Directors—R. D. Hopkins, G. W. Beaver, C. L. Weller, A. Hemms and Col. S. A. Buckingham.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Northern Belle, April 10th, \$2,057.12; Christy, 13th, \$4,506; Hussey, 14th, \$3,400; California, 13th, \$302,777.11; Con. Virginia, 6th, \$248,572.41; Raymond & Ely, 8th, \$966.73; Manhattan, 12th, \$16,864.59; Alexander, 15th, \$6,763.47; Grand Prize, 15th, \$20,600; Day, 8th, \$3,445.34; Manhattan, 15th, \$14,813.50; Northern Belle, 13th, \$3,256.94; Manhattan, 15th, \$14,812.56.

For the Paris Exposition.

The Committee on Minerals for the Paris Exposition announce that everything not in by the first of April will be left behind. It is likely that many mineral specimens intended for the great show will not reach here by that time, and as there are probably other things yet to be sent forward, it may be worth while to state that the American European Express, Baldwin Bros. & Co., Proprietors, 72 Broadway, New York, forward packages to the Paris Exposition at the following special rates: Four lbs. \$1.25; 8 lbs. \$1.50; 12 lbs. \$2.25; 20 lbs. \$3.25; 50 lbs. \$4.25; 75 lbs. \$5; 100 lbs. \$5.50, and for everything over three feet, 95 cents per foot. Custom expenses at Havre, 60 cents additional, per package. Freight in all cases to be prepaid.

WOODWARD'S GARDENS has the following new attractions: The buffalo chase; large whale skeleton; new museum; improvements in the zoological department, besides the other features which have made it popular.

MR. W. J. WOOLLEY, who took out a Canadian Patent some four years ago, is requested to call at the Mining and Scientific Press Patent Agency Office. Business of importance.

ANY PHOTOGRAPHER having a large Camera Box for sale will please notify "N. S.," at this office.

MODEL MAKER and MACHINIST.—I. A. Heald, No. 514 Commercial St., San Francisco, (fourth floor).

METALS.

[WHOLESALE.]

WEDNESDAY, M., April 17, 1878.

IRON.—			
American Pig, ton.....	23 00	@	30 00
Scotch Pig, ton.....	23 00	@	30 00
White Pig, ton.....	23 00	@	30 00
Oregon Pig, ton.....	21 00	@	30 00
Refined Bar.....	21 00	@	31 00
Horse Shoes, keg.....	5 00	@	00 00
Nail Rod.....	—	@	71 00
Norway, Oval.....	—	@	71 00
COPPER.—			
Sheathing, lb.....	34 00	@	35 00
Sheathing, Yellow.....	21 00	@	00 00
Sheathing, Old Yellow.....	21 00	@	00 00
Composition Nails.....	24 00	@	00 00
Composition Bolts.....	24 00	@	00 00
STEEL.—			
English Cast, lb.....	13 00	@	14 00
Anderson & Woods, ordinary sizes.....	15 00	@	00 00
Flat Bar.....	14 00	@	19 00
Plow Steel.....	34 00	@	12 00
TIN PLATES.—			
English C. C. Cast.....	7 50	@	8 50
Banca Tin.....	23 00	@	24 00
Australian.....	17 00	@	17 00
ZINC.—			
By the Cass.....	9 00	@	00 00
Zinc Shot 7 1/2 lb, 7 1/2 lb, 10 lb.....	9 00	@	10 00
7 1/2 lb, 11 to 14.....	10 00	@	00 00
8 1/2 lb, 8 to 10.....	11 00	@	00 00
8 1/2 lb, 11 to 10.....	11 00	@	00 00
NAILES.—			
Common sizes.....	3 15	@	23 00
QUICKSILVER.—			
By the lb.....	43 00	@	45 00

LEATHER.

[WHOLESALE.]

WEDNESDAY M., April 17, 1878.

Sole Leather, heavy, lb.....	26 00	@	29 00
Light.....	22 00	@	24 00
Jodot, 8 Kil, doz.....	48 00	@	50 00
11 to 13 Kil.....	55 00	@	56 00
14 to 16 Kil.....	55 00	@	56 00
Second Choice, 11 to 16 Kil.....	55 00	@	56 00
Cornellian, 12 to 15 Kil.....	57 00	@	57 00
Females, 12 to 13 Kil.....	57 00	@	57 00
14 to 16 Kil.....	57 00	@	57 00
Simon 10 Kil, Females, 12 to 13 Kil.....	57 00	@	57 00
14 to 16 Kil.....	57 00	@	57 00
16 to 17 Kil.....	57 00	@	57 00
Simon, 18 Kil.....	57 00	@	57 00
20 Kil.....	57 00	@	57 00
24 Kil.....	57 00	@	57 00
Robert Calf, 7 and 9 Kil.....	35 00	@	00 00
Kips, French, lb.....	1 00	@	1 35
Cal. doz.....	40 00	@	00 00
French Sheep, all colors.....	8 00	@	15 00
Eastern Calf for Backs, lb.....	1 00	@	1 25
Sheep Roams for Topping, all colors, doz.....	9 00	@	23 00
For Linings.....	5 50	@	10 50
Cal. Russset Sheep Linings.....	1 75	@	4 50
Boat Legs, French Calf, pair.....	4 00	@	4 75
Good French Calf.....	4 00	@	4 75
Best Jodot Calf.....	5 00	@	5 25
Leather, Harness, lb.....	35 00	@	38 00
Fair Bridle, doz.....	48 00	@	52 00
Skinning, lb.....	33 00	@	37 00
Well, doz.....	30 00	@	50 00
Buff, ft.....	18 00	@	20 00
Wax Side.....	17 00	@	18 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, April 17, 3 P. M.

LEGAL TENDERS in S. F., 11 A. M., 99 1/2 SILVER, 1 7/8 @ 2.00. GOLD in New York, 100 1/2.

GOLD BARS, 99 1/2 @ 2.00. SILVER BARS, 8 @ 15 1/2 cent. discount.

EXCHANGE on New York, 1 1/2; on London bankers, 49 1/2 @ 49 1/2. Commercial, 50; Paris, five francs @ dollar; Mexican dollars, 85.

LONDON Consols 94 1/2; Bonds, 105 1/2. QUICKSILVER in S. F., by the Bank, @ 1 1/2 @ 1 1/2.

Signal Service Meteorological Report.

Week Ending April 13, 1878.

HIGHEST AND LOWEST BAROMETER.									
Apr. 10.	Apr. 11.	Apr. 12.	Apr. 13.	Apr. 14.	Apr. 15.	Apr. 16.	Apr. 17.	Apr. 18.	Apr. 19.
30.05	30.04	29.90	29.89	29.78	29.73	29.97	29.95	29.90	29.85
29.95	29.90	29.85	29.83	29.60	29.59	29.78			

MINIMUM AND MAXIMUM THERMOMETER.									
64	58	58	55	56	55	56	53	51	47
53	51	52	46	44	44	44			

MEAN DAILY HUMIDITY.									
79	72	70	50	58	69	61			

PREVAILING WIND.									
SW	SW	W	W	S	SW	W			

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where he principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this act at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Calaract and Wide West Hydraulic Gravel
Mining Company. Location of principal place of business, San Francisco, Cal. Location of works, Ebo Mining District, Calaveras County, Cal.

Notice.—There are delinquent upon the following described stock, on account of assessment No. 1, levied on the fifth day of March, 1878, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Phelan, Joseph P.	5	125	\$18 75
Phelan, Joseph P.	6	125	18 75
Keefe, Windsor A., trustee.	8	500	75 00
Keefe, Windsor A., trustee.	9	500	75 00
Keefe, Windsor A., trustee.	10	500	75 00
Keefe, Windsor A., trustee.	11	500	75 00
Keefe, Windsor A., trustee.	12	500	75 00
Keefe, Windsor A., trustee.	13	500	75 00
Keefe, Windsor A., trustee.	14	500	75 00
Keefe, Windsor A., trustee.	15	500	75 00
Keefe, Windsor A., trustee.	16	500	75 00
Keefe, Windsor A., trustee.	17	500	75 00
Keefe, Windsor A., trustee.	18	500	75 00
Keefe, Windsor A., trustee.	19	500	75 00
Keefe, Windsor A., trustee.	20	500	75 00
Keefe, Windsor A., trustee.	21	500	75 00
Keefe, Windsor A., trustee.	22	500	75 00
Keefe, Windsor A., trustee.	23	500	75 00
Keefe, Windsor A., trustee.	24	500	75 00
Keefe, Windsor A., trustee.	25	500	75 00
Keefe, Windsor A., trustee.	26	500	75 00
Keefe, Windsor A., trustee.	27	500	75 00
Keefe, Windsor A., trustee.	28	500	75 00
Keefe, Windsor A., trustee.	29	500	75 00
Keefe, Windsor A., trustee.	30	500	75 00
Keefe, Windsor A., trustee.	31	500	75 00
Keefe, Windsor A., trustee.	32	500	75 00
Keefe, Windsor A., trustee.	33	500	75 00
Keefe, Windsor A., trustee.	34	500	75 00
Keefe, Windsor A., trustee.	35	500	75 00
Keefe, Windsor A., trustee.	36	500	75 00
Keefe, Windsor A., trustee.	37	500	75 00
Keefe, Windsor A., trustee.	38	500	75 00
Keefe, Windsor A., trustee.	39	500	75 00
Keefe, Windsor A., trustee.	40	500	75 00
Keefe, Windsor A., trustee.	41	500	75 00
Keefe, Windsor A., trustee.	42	500	75 00
Keefe, Windsor A., trustee.	43	500	75 00
Keefe, Windsor A., trustee.	44	500	75 00
Keefe, Windsor A., trustee.	45	500	75 00
Keefe, Windsor A., trustee.	46	500	75 00
Keefe, Windsor A., trustee.	47	500	75 00
Keefe, Windsor A., trustee.	48	500	75 00
Keefe, Windsor A., trustee.	141	100	15 00
Keefe, Windsor A., trustee.	142	100	15 00
Keefe, Windsor A., trustee.	143	100	15 00
Keefe, Windsor A., trustee.	144	100	15 00
Keefe, Windsor A., trustee.	145	100	15 00
Keefe, Windsor A., trustee.	146	100	15 00
Keefe, Windsor A., trustee.	147	100	15 00
Keefe, Windsor A., trustee.	148	100	15 00
Keefe, Windsor A., trustee.	149	100	15 00
Keefe, Windsor A., trustee.	150	100	15 00
Keefe, Windsor A., trustee.	151	100	15 00
Keefe, Windsor A., trustee.	152	100	15 00
Keefe, Windsor A., trustee.	153	100	15 00
Keefe, Windsor A., trustee.	154	100	15 00
Keefe, Windsor A., trustee.	155	100	15 00
Keefe, Windsor A., trustee.	156	100	15 00
Keefe, Windsor A., trustee.	157	100	15 00
Keefe, Windsor A., trustee.	158	100	15 00
Keefe, Windsor A., trustee.	159	100	15 00
Keefe, Windsor A., trustee.	160	100	15 00
Keefe, Windsor A., trustee.	161	100	15 00
Keefe, Windsor A., trustee.	162	100	15 00
Keefe, Windsor A., trustee.	163	100	15 00
Keefe, Windsor A., trustee.	164	100	15 00
Keefe, Windsor A., trustee.	165	100	15 00
Keefe, Windsor A., trustee.	166	100	15 00
Keefe, Windsor A., trustee.	167	100	15 00
Keefe, Windsor A., trustee.	168	100	15 00
Keefe, Windsor A., trustee.	169	100	15 00
Keefe, Windsor A., trustee.	170	100	15 00
Keefe, Windsor A., trustee.	171	100	15 00
Keefe, Windsor A., trustee.	172	100	15 00
Keefe, Windsor A., trustee.	173	100	15 00
Keefe, Windsor A., trustee.	174	100	15 00
Keefe, Windsor A., trustee.	175	100	15 00
Keefe, Windsor A., trustee.	176	100	15 00
Keefe, Windsor A., trustee.	177	100	15 00
Keefe, Windsor A., trustee.	178	100	15 00
Keefe, Windsor A., trustee.	179	100	15 00
Keefe, Windsor A., trustee.	180	100	15 00
Keefe, Windsor A., trustee.	181	100	15 00
Keefe, Windsor A., trustee.	182	100	15 00
Keefe, Windsor A., trustee.	183	100	15 00
Keefe, Windsor A., trustee.	184	100	15 00
Keefe, Windsor A., trustee.	185	100	15 00
Keefe, Windsor A., trustee.	186	100	15 00
Keefe, Windsor A., trustee.	187	100	15 00
Keefe, Windsor A., trustee.	188	100	15 00
Keefe, Windsor A., trustee.	189	100	15 00
Keefe, Windsor A., trustee.	190	100	15 00
Keefe, Windsor A., trustee.	191	100	15 00
Keefe, Windsor A., trustee.	192	100	15 00
Keefe, Windsor A., trustee.	193	100	15 00
Keefe, Windsor A., trustee.	194	100	15 00
Keefe, Windsor A., trustee.	195	100	15 00
Keefe, Windsor A., trustee.	196	100	15 00
Keefe, Windsor A., trustee.	197	100	15 00
Keefe, Windsor A., trustee.	198	100	15 00
Keefe, Windsor A., trustee.	199	100	15 00
Keefe, Windsor A., trustee.	200	100	15 00
Keefe, Windsor A., trustee.	201	100	15 00
Keefe, Windsor A., trustee.	202	100	15 00
Keefe, Windsor A., trustee.	203	100	15 00
Keefe, Windsor A., trustee.	204	100	15 00
Keefe, Windsor A., trustee.	205	100	15 00
Keefe, Windsor A., trustee.	206	100	15 00
Keefe, Windsor A., trustee.	207	100	15 00
Keefe, Windsor A., trustee.	208	100	15 00

Names.	No. Certificate.	No. Shares.	Amount.
Keefe, Windsor A., trustee.	209	10	1 50
Keefe, Windsor A., trustee.	210	10	1 50
Keefe, Windsor A., trustee.	211	10	1 50
Keefe, Windsor A., trustee.	212	10	1 50
Keefe, Windsor A., trustee.	213	50	7 50
Keefe, Windsor A., trustee.	214	50	7 50
Keefe, Windsor A., trustee.	215	50	7 50
Keefe, Windsor A., trustee.	216	50	7 50
Keefe, Windsor A., trustee.	217	50	7 50
Keefe, Windsor A., trustee.	218	50	7 50
Keefe, Windsor A., trustee.	219	50	7 50
Keefe, Windsor A., trustee.	220	50	7 50
Keefe, Windsor A., trustee.	221	50	7 50
Keefe, Windsor A., trustee.	222	50	7 50
Keefe, Windsor A., trustee.	223	50	7 50
Keefe, Windsor A., trustee.	224	50	7 50
Keefe, Windsor A., trustee.	225	50	7 50
Keefe, Windsor A., trustee.	226	50	7 50
Keefe, Windsor A., trustee.	227	50	7 50
Keefe, Windsor A., trustee.	228	50	7 50
Keefe, Windsor A., trustee.	229	50	7 50
Keefe, Windsor A., trustee.	230	50	7 50
Keefe, Windsor A., trustee.	231	50	7 50
Keefe, Windsor A., trustee.	232	50	7 50
Keefe, Windsor A., trustee.	233	50	7 50
Keefe, Windsor A., trustee.	234	50	7 50
Keefe, Windsor A., trustee.	235	50	7 50
Keefe, Windsor A., trustee.	236	50	7 50
Keefe, Windsor A., trustee.	237	50	7 50
Keefe, Windsor A., trustee.	238	50	7 50
Keefe, Windsor A., trustee.	239	50	7 50
Keefe, Windsor A., trustee.	240	50	7 50
Keefe, Windsor A., trustee.	241	50	7 50
Keefe, Windsor A., trustee.	242	50	7 50
Keefe, Windsor A., trustee.	243	50	7 50
Keefe, Windsor A., trustee.	244	50	7 50
Keefe, Windsor A., trustee.	245	50	7 50
Keefe, Windsor A., trustee.	246	50	7 50
Keefe, Windsor A., trustee.	247	50	7 50
Keefe, Windsor A., trustee.	248	50	7 50
Keefe, Windsor A., trustee.	249	50	7 50
Keefe, Windsor A., trustee.	250	50	7 50
Keefe, Windsor A., trustee.	251	50	7 50
Keefe, Windsor A., trustee.	252	50	7 50
Keefe, Windsor A., trustee.	253	50	7 50
Keefe, Windsor A., trustee.	254	50	7 50
Keefe, Windsor A., trustee.	255	50	7 50
Keefe, Windsor A., trustee.	256	50	7 50
Keefe, Windsor A., trustee.	257	50	7 50
Keefe, Windsor A., trustee.	258	50	7 50
Keefe, Windsor A., trustee.	259	50	7 50
Keefe, Windsor A., trustee.	260	50	7 50
Keefe, Windsor A., trustee.	261	50	7 50
Keefe, Windsor A., trustee.	262	50	7 50
Keefe, Windsor A., trustee.	263	50	7 50
Keefe, Windsor A., trustee.	264	50	7 50
Keefe, Windsor A., trustee.	265	50	7 50
Keefe, Windsor A., trustee.	266	50	7 50
Keefe, Windsor A., trustee.	267	50	7 50
Keefe, Windsor A., trustee.	268	50	7 50
Keefe, Windsor A., trustee.	269	50	7 50
Keefe, Windsor A., trustee.	270	50	7 50
Keefe, Windsor A., trustee.	271	50	7 50
Keefe, Windsor A., trustee.	272	50	7 50
Keefe, Windsor A., trustee.	273	50	7 50
Keefe, Windsor A., trustee.	274	50	7 50
Keefe, Windsor A., trustee.	275	50	7 50
Keefe, Windsor A., trustee.	276	50	7 50
Keefe, Windsor A., trustee.	277	50	7 50
Keefe, Windsor A., trustee.	278	50	7 50
Keefe, Windsor A., trustee.	279	50	7 50
Keefe, Windsor A., trustee.	280	50	7 50
Keefe, Windsor A., trustee.	281	50	7 50
Keefe, Windsor A., trustee.	282	50	7 50
Keefe, Windsor A., trustee.	283	50	7 50
Keefe, Windsor A., trustee.	284	50	7 50
Keefe, Windsor A., trustee.	285	50	7 50
Keefe, Windsor A., trustee.	286	50	7 50
Keefe, Windsor A., trustee.	287	50	7 50
Keefe, Windsor A., trustee.	288	50	7 50
Keefe, Windsor A., trustee.	289	50	7 50
Keefe, Windsor A., trustee.	290	50	7 50
Keefe, Windsor A., trustee.	291	50	7 50
Keefe, Windsor A., trustee.	292	50	7 50
Keefe, Windsor A., trustee.	293	50	7 50
Keefe, Windsor A., trustee.	294	50	7 50
Keefe, Windsor A., trustee.	295	50	7 50
Keefe, Windsor A., trustee.	296	50	7 50
Keefe, Windsor A., trustee.	297	50	7 50
Keefe, Windsor A., trustee.	298	50	7 50
Keefe, Windsor A., trustee.	299	50	7 50
Keefe, Windsor A., trustee.	300	50	7 50
Keefe, Windsor A., trustee.	301	50	7 50
Keefe, Windsor A., trustee.	302	50	7 50
Keefe, Windsor A., trustee.	303	50	7 50
Keefe, Windsor A., trustee.	304	50	7 50
Keefe, Windsor A., trustee.	305	50	7 50
Keefe, Windsor A., trustee.	306	50	7 50
Keefe, Windsor A., trustee.	307	50	7 50
Keefe, Windsor A., trustee.	308	50	7 50
Keefe, Windsor A., trustee.	309	50	7 50
Keefe, Windsor A., trustee.	310	50	7 50
Keefe, Windsor A., trustee.	311	50	7 50
Keefe, Windsor A., trustee.	312	50	7 50
Keefe, Windsor A., trustee.	313	1000	150 00
Keefe, Windsor A., trustee.	314	500	75 00
Keefe, Windsor A., trustee.	315	1000	150 00
Dunphy, William, trustee.	316	500	75 00
Dunphy, William, trustee.	317	500	75 00
Dunphy, William, trustee.	318	100	15 00
Dunphy, William, trustee.	319	100	15 00
Dunphy, William, trustee.	320	100	15 00
Dunphy, William, trustee.	321	20	3 00
Dunphy, William, trustee.	322	100	15 00
Dunphy, William, trustee.	323	20	3 00
Dunphy, William, trustee.	324	20	3 00
Dunphy, William, trustee.	325	20	3 00
Dunphy, William, trustee.	326	20	3 00
Peter Carr, trustee.	410	100	15 00
Elizabeth Matthison.	417	20	3 00
Eather Bach.	428	50	7 50
Eather Bach.	430	50	7 50
Bates, Thomas.	435	50	7 50
Bates, Thomas.	437	50	7 50
Bates, Thomas.	446	25	3 75
Bates, Thomas.	448	25	3 75
Bates, Thomas.	451	50	7 50
Bates, Thomas.	452	25	3 75
Bates, Thomas.	454	25	3 75
Bates, Thomas.	455	50	7 50
Bates, Thomas.	456	25	3 75
Bates, Thomas.	457	50	7 50
Bates, Thomas.	458	50	7 50
Bates, Thomas.	459	50	7 50
Bates, Thomas.	461	10	1 50
Bates, Thomas.	462	5	75
Bates, Thomas.	463	10	1 50
Bates, Thomas.	464	5	75
Bates, Thomas.	465	10	1 50
Bates, Thomas.	466	5	75
Bates, Thomas.	467	10	1 50
Bates, Thomas.	468	5	75
Bates, Thomas.	470	5	75
Bates, Thomas.	471	10	1 50
Bates, Thomas.	472	10	1 50
Bates, Thomas.	473	10	1 50
Bates, Thomas.	474	10	1 50
Bates, Thomas.	475	10	1 50
Bates, Thomas.	476	10	1 50
Bates, Thomas.	477	10	1 50
Bates, Thomas.	478	10	1 50
Bates, Thomas.	479	10	1 50
Bates, Thomas.	481	10	1 50
Bates, Thomas.	482	25	3 75
Bates, Thomas.	483	5	75
Bates, Thomas.	487	10	1 50
Bates, Thomas.	489	10	1 50
Bates, Thomas.	491	5	75
Bates, Thomas.	492	5	75
Bates, Thomas.	493	5	75
Bates, Thomas.	494	50	7 50
Half Charles.	474	50	7 50
Tallmadge, Laura A.	542	25	3 75
Sweeney, Charles.	545	50	7 50
Murdoch, Wm B, trustee.	582	25	3 75
Murdoch Wm B, trustee.	583	25	3 75

Names.	No. Certificate.	No. Shares.	Amount.
Murdoch, Wm B, trustee.	584	25	3 75
Murdoch, Wm B, trustee.	585	25	3 75
Murdoch, Wm B, trustee.	586	50	7 50
Murdoch, Wm B, trustee.	587	50	7 50
Murdoch, Wm B, trustee.	588	50	7 50
Murdoch, Wm B, trustee.	589	50	7 50
Murdoch, Wm B, trustee.	590	50	7 50
Murdoch, Wm B, trustee.	591	50	7 50
Murdoch, Wm B, trustee.	592	100	15 00
Murdoch, Wm B, trustee.	593	100	15 00
Murdoch, Wm B, trustee.	594	100	15 00
Murdoch, Wm B, trustee.	595	100	15 00
Murdoch, Wm B, trustee.	596	100	15 00
Murdoch, Wm B, trustee.	597	100	15 00
Brodie, James, trustee.	598	1000	150 00
Brodie, James, trustee.	599	050	142 50
Smith, Wm F, trustee.	143	100	15 00
Smith, Wm F, trustee.	144	100	15 00

And, in accordance with law, and an order of the Board of Directors, made on the fifth day of March, 1878, so many shares of each parcel of said stock as may be necessary, will be sold at public auction at the office of the Comptroller of the rooms of Dr. Floto, 402 Kearny street, San Francisco, Cal., on the 29th day of April, 1878, at the hour of 12 o'clock, M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

JOHN HOWARD CAREY, Secy.

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HENRY S. SMITH.

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Manufacturers of all kinds of

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ALL STYLES OF FANCY HEAD BOLTS.

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Golden State Pressure Blowers.

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Boiler repairs promptly attended and at a very moderate rates.

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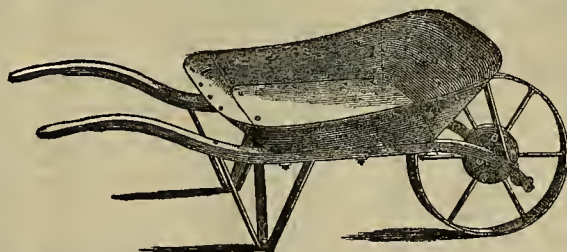
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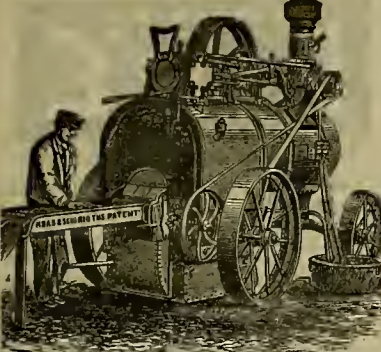
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California M. Co.,
C & O Shaft,
Utah M. Co.,
Opblir M. Co.,
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Hullon M. Co.,
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Gould & Curry M. Co.,

Best & Belcher M. Co.,
Crown Point M. Co.,
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One large sized Rock Breaker, Varney & Rix, size 9x15; one Wood Splitting Machine; one 36-inch cylinder Russel Separator, (with extra cylinder,) and Lauffenberg shoe—very cheap, on account of owner's death; (will be sold with or without any of above engines.) All of the above second-hand engines have been in shop and overhauled, and are in good working order. Various other machinery for sale. Purchase made on Commission. Machinery repairs solicited. Specialty of Portable Engines and Boilers for threshing.

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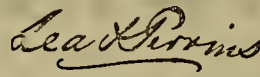
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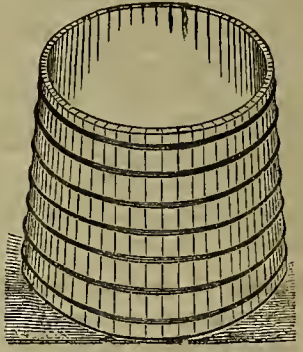
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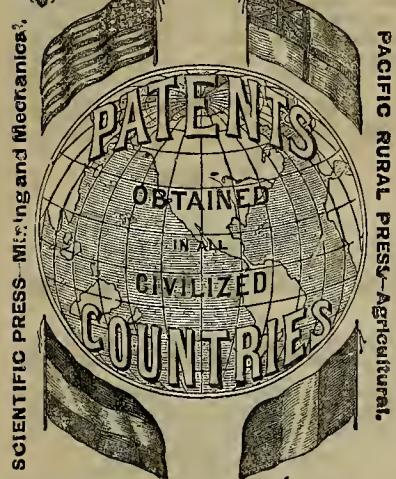
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They never have to be taken off the mandrel, and will stand up square in edging and stock, which makes them indispensable for gangs.

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MINING AND SCIENTIFIC PRESS. \$4 a year. Published weekly at San Francisco, Cal. Our western friends will find this the most readable of papers, it being filled brim full of good things. We are always anxious to read each number.—*Indianapolis Mechanical Journal*.

MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, APRIL 27, 1878.

VOLUME XXXVI.
Number 17.

Hoe's Chisel-Tooth Saws:

We illustrate herewith the Hoe patent chisel tooth for circular saws, which has attained great success in the East, and has recently been introduced on this coast. The engraving represents the principle of the chisel-tooth mill and edger saw. The part marked *A* is a part of a rim of a circular saw-plate, in which is a No. 4 tooth, such as are put in mill saws, and a No. 2 tooth, such as are placed in edgers and shop saws. *B* are the chisel-hits or teeth and *C* the shanks, which hold the bits in place. The holes in the shanks are for a wrench, with which the shanks and bits are turned out of or into the plate when the bits get dull and it is necessary to put in new ones.

The shanks and hits have a groove in the back, into which the saw-plate fits, forming a dove-tail joint. The circle in the saw-plate is a true circle, the shank being eccentric, so that when the shank is turned into its place, carrying the hit with it, the bit is held securely against the plate. The shoulder of the bit coming against the plate, prevents it being turned around too far. When the teeth become dull a new set can be inserted in five minutes. The saw is then in perfect order. They are always exactly the same size and always perfectly round.

The round socket, the only one in which a tooth is firmly fixed in a saw-plate without rivets or keys, has received its finishing accompaniment in the rotary locking shank, by which the cutting hit is seized, carried into the socket and held in a positive position. This device is strong and simple in construction, reliable and expeditious, and, at each insertion of a new set of hits, the saw is in much better condition than it is possible for an expert sawyer to put a saw in, by dressing it in any of the ordinary ways.

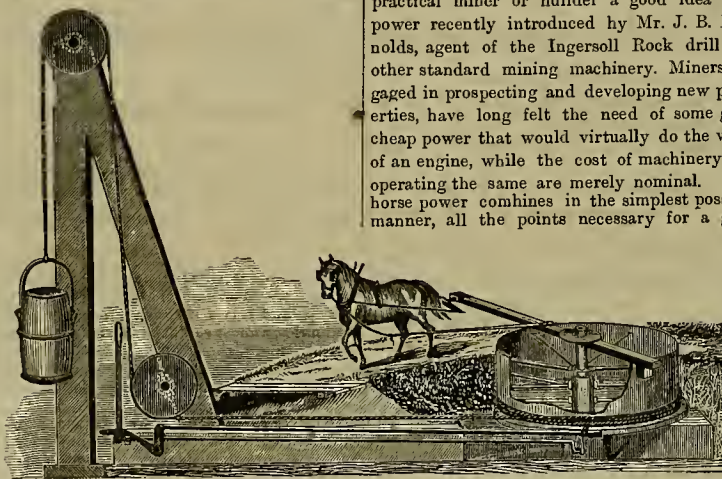
The saws are now running with unequalled success in all the principal lumber districts throughout the continent, and in many cases subjected to rough treatment that would utterly destroy saws of other construction.

The chisel hits are forged into perfect shape from hot steel rods at one blow, thus, during the process, leaving the metal, which is of superior quality, in a state of rest without fracture, so that the hits cut knots without breaking and go through iron or stone at one-twentieth the cost and damage occasioned to a solid tooth saw.

The correct mechanical construction of this is manifest in the great strength and durability of its parts. The cutting hits, being short, are stiff, and the matching of the circular back with the plate prevents any lateral or rocking movement. They are tempered a little harder than a solid saw, will run longer before getting dull and may be ground or filed eight or ten times. Each hit will cut from 1,000 to 3,000 feet of lumber, depending upon the quality of the logs and the feed carried. When the teeth become dull they can be touched up with an emery wheel and reused. At the trial at the Cincinnati Exposition, in 1874, the chisel-hit saw was the only one of the 15 saws on trial that cut a whole log into all perfect boards.

Since the saw was introduced on this coast

the edge of the saw between the teeth has been cut away to some extent, and the shanks altered to correspond, and thickened in order to give more chip room and keep the chips from passing by the teeth and heating the rim. This was necessary, as the logs out here are so large in comparison with the logs usually cut in the East. Since this was done the saw has given great satisfaction. The sawyer at the Albion mill, Albion river, says he would rather pay for these shanks himself than to run the old ones. They shed the dust better, not allowing it to pass by the teeth and heat the saw. The Mendocino Lumber Company, in ordering



IMPROVED HORSE POWER FOR HOISTING PURPOSES.

some of these saws, say they give great satisfaction. Mr. Wallace, of Meigs' Port Madison mill, says: "If all the saws in the mill were of this kind and in proportion to the work they do, one engine would drive the mill as well as hoth do now." The sawyer at Hobbs, Pomeroy & Co.'s mill, at Crescent City, says he ran

hoisting engine on a small mine, viz.: power to hoist, a brake to hold the load at any point, or to lower at any speed, and means to stop the motion instantly at any desired point.

The power is mainly built of wrought iron, and is of simple construction. An ordinary timber bed-frame is laid, on which is hoisted a

are also agents for the Albany Lubricating compound and cups, Katzenstein's metallic packing, etc. The lubricating compound and cylinder oil are highly recommended. This firm is agent for mill and mine supplies of various kinds, and have also an agency at Virginia, Nev. (P. O. box 616.) The Albany compound and cups are extensively used in the mining machinery at Virginia and elsewhere.

Miners' and Builders' Horse Power.

The accompanying illustration will give the practical miner or builder a good idea of a power recently introduced by Mr. J. B. Reynolds, agent of the Ingersoll Rock drill and other standard mining machinery. Miners engaged in prospecting and developing new properties, have long felt the need of some good cheap power that would virtually do the work of an engine, while the cost of machinery and operating the same are merely nominal. This horse power combines in the simplest possible manner, all the points necessary for a good

not. When the collar is down the radial arms are drawn in so that their outer ends do not project through the sides of the cylinder, but when the collar is drawn up these arms project through the cylinder, so that lugs on the windlass arm engage with two opposite arms and the cylinder is revolved. The collar slides on the standard and lengthens or shortens the arms just as the hand of an umbrella does which carries the pieces forming the framework.

Now when the horse moves around in the circle if the arms are drawn on he simply moves the windlass bar without revolving the drum; but when the ends of the arms are projected through the sides of the drum, the lugs on the windlass arm engage with the nearest of the points and revolve the drum, thus winding up the rope.

It will be seen that the simple construction is a very great improvement over the ordinary whims. The horse can keep on walking around while the reel is revolving in an opposite direction in lowering a load or empty tub. When the man at the mouth of the shaft wants to hoist he simply throws over his lever and engages the arms with the lugs on the windlass bar when the horse takes the load. If it is necessary to stop the load at any time, by throwing the lever the other way the horse keeps on but the drum stops. An ordinary strap brake is applied to the drum and a foot lever is placed beside the other lever at the shaft mouth to control the brake. The horse power may be placed at any convenient distance from the shaft and the lever rods extended from it.

By this means the power is completely under the control of the man, and the danger of overwinding is avoided. The horse can be disconnected from the drum at any time and rest, or he may keep on walking as the case may be.

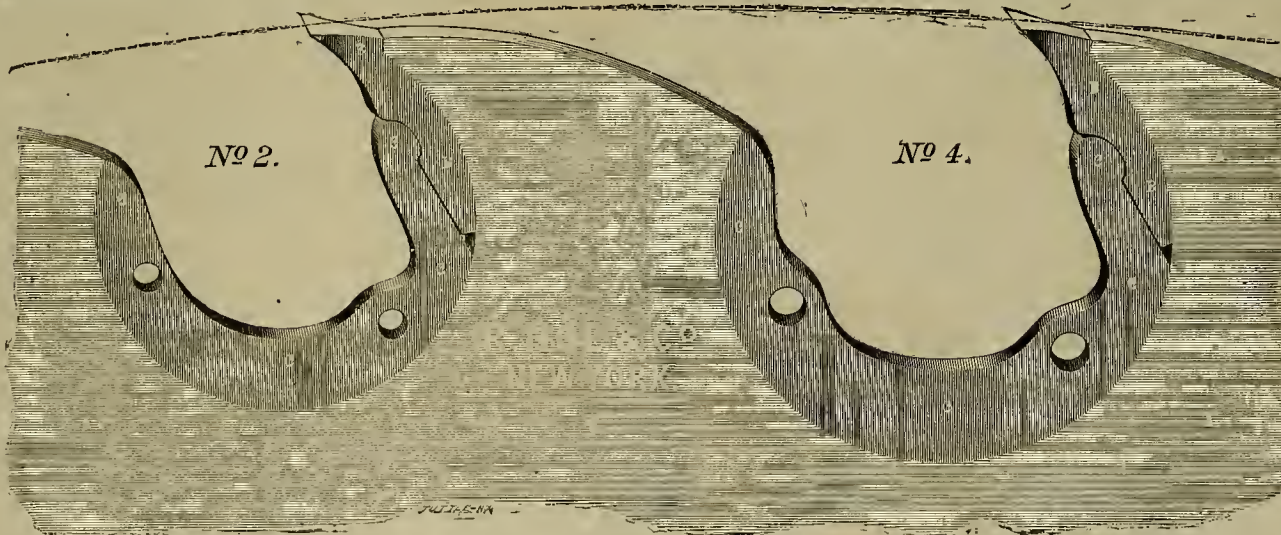
The entire working parts of this power are of iron and made in a good, workmanlike manner, with a view to economize in weight and at the same time to furnish a machine of all necessary strength.

The drum will wind 500 feet of wire rope capable of a working strain of 1,500 pounds, without lapping or covering to exceed 14 inches of drum surface. A patent for this

process has been applied for through the MINING AND SCIENTIFIC PRESS Patent Agency, and they have already commenced to be introduced in the mining districts of California and Nevada. They are manufactured and can be seen at the office of J. B. Reynolds, 307 Market street, in this city. For hoisting purposes this class of power is excellent, as it is under complete control without the operator having to be close beside the horse. For mining purposes or prospecting mines it appears to us a very useful and efficient contrivance.

CHEAP TRAVELING.—Paris Exposition Commissioner Quimby has made arrangements with the Pacific Steamship Company, and through them with the Royal Mail Steamship Company, that emigrants can be hooked from Southampton to San Francisco for \$100.

SECRETARY SCHURZ attributes his recent illness to the large quantities of green tea which he has been drinking to produce wakefulness for night work.



THE HOE PATENT CHISEL TOOTH FOR CIRCULAR SAWS

the first set of teeth, "over 18 hours, some of the time on three-inch feed." The saw cuts very nice lumber, goes through the knots in a wonderful manner, and does not take as much power as the old saws. The saw is in use also at Dixon & Co.'s mill, Coffee's Cove, Hansen, Ackerson & Co.'s Tacoma, W. T., mill, Nelson Bro.'s mill, Plum valley, Sierra county, and at many other places on this coast. We have been shown numerous testimonials from sawyers and other practical mill men who unite in recommending the Hoe saw.

The agents for this coast are Messrs H. L. Tatum & Co., 51 Fremont street, S. F. They

metal bed-piece, carrying a hollow standard which projects up inside the cylinder or drum, and on top of which is placed the windlass arm, to which the horse is attached. A sliding collar is placed on this standard inside the drum, and on this collar are pivoted a number of radial arms which extend out to holes in the side of the cylinder or winding drum. Inside of the standard is a clutch capable of being moved up or down by means of a crank-rod and lever-bar. This clutch is so engaged with the collar carrying the arms that by moving the lever bar the clutch draws the collar up or down on the standard, whether the drum is in motion or

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

The Bodie Mines.—No. 1.

[By the MINING AND SCIENTIFIC PRESS Correspondent.]

An Outline of the Early History Thereof, with Something of Present Affairs.

When the placer mines on the western slope of the Sierras began to lose caste, the early emigration commenced to rebound eastward, and during the latter portion of the "50's," paying diggings were discovered at various points opposite the old stamping places of '49. Along this line of successful exploration, the Mono county mines were discovered, out of which grew an interest in quartz, resulting in the organization of Bodie district, now a chief center of attraction for mining men. As nearly as can be arrived at, the first locations were for placer diggings, and were made in September, 1859, by a man named Bodie. The first locations along the line of the Comstock were already a matter of more or less public interest, and, owing to the scarcity of water in Bodie, the quartz indications soon overshadowed the importance of the rich gravel deposits. The original discoverer, however, met with a melancholy death before realizing any benefit from either. While returning from Mono, where he had been to obtain provisions, in March, '60, he was lost and perished in one of the snow storms, to which the high and exposed altitude is subject. The work of developing the district was slow, and but for the more exciting times incident to the adjoining district of Esmeralda, it is probable that Bodie might have remained dormant indefinitely. The latter district was not discovered until a year later, but it acquired a notoriety, to say the least, that served to lend interest to everything round about, and contemporaneous with said excitement, Bodie secured the organization of several companies, with capital sufficient to open up several claims, and built a couple of mills. This occurred during '63-4, and in sympathy, so to speak, with the decline of affairs in Esmeralda, Bodie developments came to a practical standstill and so remained for a period of about 14 years. It would require a full page of the PRESS to do anything like justice to the few men who held on to the ragged edge of Bodie bluff during all those years and maintained their faith by their works, an insignificant number of whom have at last realized something of their early hopes. "To the grave with the dead and the living to the bread," and, according to the Panza philosophy, we will enter upon the new dispensation.

After a succession of failures and changes of ownership, at least one of the old claims on Bodie bluff fell into fortunate and judicious hands. This event took place in September, '76, and within one year, to a day, a dividend of \$1 per share was declared, in addition to the construction of a 20-stamp mill, erection of steam hoisting works and a tramway between mill and mine, a large quantity of supplies provided in advance, and all out of the proceeds of the mine. The first ore crushings by the Standard company was had in the mill of the Syndicate company, a property purchased for taxes in '75, and having been handed down from '65 by the Empire company, of New York. The Standard mine—originally the old Bunker Hill—was purchased by Seth and Dan Cook, upon the recommendation of John F. Boyd. No more interesting property altogether in the way of mining exists anywhere on the coast. It is a gold mine, which is explored to a depth of over 800 feet and a length of equal extent, and everywhere maintaining a uniformity of size and richness and perfect formation that give the best assurance of permanency, according to every practical and scientific test. The ore is cheaply mined and milled, the dividends are a regular monthly occurrence, but the stock of the company is not a feature of the market.

Out of the gratifying success of the Standard, has grown all the excitement about Bodie, including the organization of half a dozen strong companies and the rapid development of the district. The Bechtel, next to the Standard, is most spoken of, having made comparatively extensive explorations. The vein is not so large, as a rule, as the Standard, and varies in uniformity, recently exerting a depressing influence upon the stock, but of late the formation is quite favorable again, and all in all the Bechtel will be rated as a leading property in Bodie. Next to the Standard, however, the Syndicate company are carrying out a programme which will do most towards determining the more distant future of the district. The Standard company, in addition to their immediate operations as to the mine, are sinking a great central shaft, which might of itself put the Bodie Bluff mines to a pretty thorough test within a year or so, while the Syndicate people are pushing a tunnel into the north end at a low level, running parallel with the veins which incline to a common center, for the purpose of crosscutting each way. At another time I will explain this feature of the district by means of a diagram. Of the other operations on the Bluff proper, the Bodie, Bulwer, Belvidere, McClintock and Blackhawk are the most conspicuous. The usual depths attained as a rule being about 250 feet, with drifts and crosscuts, and all showing veins of more or

less importance, but none of the companies making a business as yet of extracting ore beyond that necessary in exploration. At present there is no milling facilities in the district equal to the demands of the Standard alone, and no new mill out-and-out is proposed to be erected in advance of thorough prospecting. An old four-stamp mill is rapidly approaching completion, and the important repairs on the Syndicate (the old Empire creation of 1864 and '65) will be effected early in May, so that custom work will not be altogether slighted.

The district shows considerable activity over a scope of country one by three miles in extent. The southern end is especially increasing in interest, owing to the discovery last December of an extensive and rich deposit of vein matter called the Richter, after the name of the fortunate gold-hunter. (Its incorporated title, as printed, is "Richer," an auspicious play upon the word.) Should this assume the permanent form it gives promise of, Bodie Bluff will have to look to its laurels. A company of practical men will proceed at once to its development, and it will not be surprising if they build a mill of their own ere the end of the present year. About midway north and south, and on the eastern side of the district, the Red Cloud company are doing fine work in the way of exploration, and with a most auspicious outlook, looking to the necessity of still another mill at an early day. They have steam hoisting works and have attained a depth of 250 feet, with considerable drifting and crosscutting. Works of lesser magnitude but showing well, are the Pacific, the Black Hawk, Spaulding, Goodshaw, the Booker and others.

Under the new dispensation, Bodie has made rapid progress, but there is much to do yet, and much more worthy to be said. It will bear inspection now, and will constitute an interesting theme for discussion for an indefinite period. J. W.

Mining in Yuba and Placer Counties.

[From Our Own Correspondent.]

My last closed with some account of copper operations at Spenceville, in Nevada county. Crossing into Yuba, five miles south of Smartsville,

The Lone Tree G. & S. M. Co.,

Under the superintendence of Mr. S. P. Hussey, were found busily at work on a quartz ledge favorably situated on an elevated spot of ground in the foothills, overlooking the Sacramento valley. The company first broke ground about a year ago, since which a shaft has been sunk 150 feet, a drift run north from bottom of same 40 feet and another south some 60 feet, showing an average width of vein of four feet. A mill test of rock at Grass Valley gave \$14 per ton. The prospect of the mine is considered good and daily growing better. At Lincoln, in Placer county,

Some Matters—Mining and Mechanical.—Are met with of sufficient importance to require more than a passing mention. The village is situated on the line of the California and Oregon railroad, 10 miles from its junction with the Central Pacific. It has more than the usual complement of blacksmith shops—one of the best being that of Mr. John Haenny, with a good wagon and carriage making department in connection; but the most important enterprise in the place is the extensive manufacturing establishment of the

California Vitrified Sewer Pipe Works, Messrs. Gladding, McBean & Co., proprietors, with office at 213 Market street, in your city, the name fully indicating its object. The pipe is manufactured from a combination of the somewhat celebrated stoneware clays of the vicinity. The material is rendered homogeneous throughout by means of very powerful machinery, and as a steam press is employed, bringing to bear a great pressure, the pipe is made very compact—in fact, at a high temperature, becoming thoroughly vitrified and entirely impervious to the acids, gases and steam from city sewers, thus rendering it of almost priceless value as a sanitary agent. Calculating the ordinary amount of rainfall on three acres to be 1.131 gallons per minute, a 12-inch pipe with nine inches fall per 100 feet will be ample for the purpose, with a large margin for contingencies.

A Coal Mine,

The Cook & Spinks, is located within sight of Lincoln, and covers 100 acres of ground. It is opened by shaft 4 hy 6 feet to the depth of 70 feet. The main drift from the bottom of the shaft has been run 260 feet, following the coal bed, which lies in a horizontal position. Two cross-drifts, each 130 feet, have also been made, passing the entire distance through coal. The developments show the ledge to be 7½ feet in thickness, with two clay seams interlying, the upper from 4 to 6 inches thick and 3½ feet from the top of the coal, and the lower about 8 inches thick and one foot from the bottom. The formation overlying the coal is composed of two strata of clay, with a streak from 2 to 4 feet thick (interposed) of a pure white sand, crystallized, and believed to be of a quality well adapted for manufacturing white glass, the stratum nearest the surface being a fire-clay and the one immediately over the coal plastic clay. The coal is a very good quality of the lignite class, represented as the best of that kind heretofore found in the State, and as wood

is fast growing scarcer, the demand for it will soon be greater than now.

A Quartz Ledge.

Five miles north of Lincoln, a mine known as the "31," owned by Messrs. Crosby & Baker, has been opened by four shafts, the greatest depth reached being 80 feet. It lies between the slate and granite, with a beautiful clay gangue one foot thick on the foot and granite wall. The ledge is from four to six feet. One hundred tons crushed at the rate of \$10 per ton.

A Curiosity.

A piece of scrap iron completely coated with copper having been found by Mr. J. C. Crosby in the water flowing out of an old tunnel in this same neighborhood, he immediately made a relocation. It has been reopened about 50 feet in length, the bottom covered with lumber and the sides boarded up about six inches. This box, together with 7 tanks 12 feet by 18 inches wide on the outside of the tunnel, is filled with scrap iron, and the water from the old mine allowed to flow over the whole. Being strongly impregnated with sulphuric acid, the iron is eaten up and the copper precipitated. The contents first appear simply as a red mud, begin to harden in from four to six weeks, and in six months are taken out pure hard copper. By this cheap and effective arrangement about 200 pounds are made per day.

A Cheap Concentrator

Was also seen here, the invention of Mr. J. C. Crosby. Although it cannot well be described in the absence of an illustration, yet its chief points of advantage may be briefly stated:

1st. It is represented to save as many if not more sulphurets than the best in use.

2d. It saves two grades, a coarser and a finer.

3d. It is recommended for its cheapness; a pair, worked by the same machinery, costing but \$60.

4th. It is made of lumber and can be put up by the carpenter of the mill; and last, not being patented, is open to the public. A. C. K. April 14th, 1878.

Dr. Lewis' Camping Tour.

We have received from Dr. Dio Lewis the following spirited note about his camping tour, to which we have alluded before. We believe the trip will be productive of health and pleasure to all who undertake it:

EDITORS PRESS:—On the first of May we begin our camping trip through the mountains of this State. We shall be absent four and a half months, and travel between one and two thousand miles, almost exclusively in the mountains. Already more than 30 ladies and gentlemen have enrolled their names in our company. Members of the party will pay just enough to meet the actual expenses.

If about 15 persons, slaves of the alcoholic appetite, would join us for the summer I would engage to cure them of their unhappy malady. In such a life more can be done to cure this disease of the brain and nervous system in a month than can be done in a year in any of the institutions established for that purpose. Persons may join at any time up to July 1st, and can send for circular to W. S. Lyon, Oakland, Cal.

A MISTAKE.—We stated last week that the Legislature had appropriated \$50 per month to J. W. Marshall, the discoverer of gold, at Coloma. A bill to that effect passed the Senate, but, we are sorry to say, failed to pass the Assembly. The State has been supporting Mr. Marshall for several years, and to now, in his old age and feeble condition, in the time of his greatest need, to go back on him, is simply an outrage. It is evident that he must soon be subjected to the humiliation of becoming a county charge or depend upon private charity. If an appropriation to Marshall, by the State, was to be left to the people, he would get it by an overwhelming majority. It would be a credit to the millionaires of the coast, were they to contribute a moiety of their wealth to a fund to be devoted to the support of the man who opened the door to their fortunes during the brief period that remains to him.—*El Dorado Republican.*

THE CALIFORNIA QUICKSILVER MINE.—This property, says the Woodland Mail, is now in splendid condition, showing more first-class ore than ever before. The company have had built, during the past fall and winter, three new furnaces, two of which are for the reduction of fine ore, with capacities respectively of 15 and 20 tons per day. The third is for the reduction of mercurial soot, to be used in the place of iron retorts and with less than half the expense. The products of these mines go to market through Yolo county, and will be double what they have heretofore been. All supplies for consumption at the mines, for man and beast, are purchased in Yolo county, and certainly adds something to our business, when we consider the fact that there are between 75 and 100 men at work and a large number of horses and cattle.

ARIZONA BULLION.—It is estimated by mining experts who keep posted on the yield of bullion being produced monthly in Arizona, that the amount will aggregate \$300,000, which amount is liable to be doubled within the next six months. Arizona in two years from this time will lead Colorado in the production of precious metals.—*Prescott Miner.*

Death in the Depths.

Mining accidents are of so frequent occurrence on the Comstock that they have come to be considered as a matter of course; that is, if they are considered at all. The particulars are given with great exactness by the reporters, every minute detail and item attending the disaster being spread forth; and after all this is done, the paper is scarcely read before it is thrown aside, and little is afterward thought of the story of death which is told.

In order to understand the sorrow and misery occasioned by the death of one of these "stalwart toilers of the deep," one has but to witness the scene when the dead miner is brought to his own home. A *News* reporter was present upon such an occasion not long ago, and the impression made at that time will be as lasting as life.

An express wagon drove slowly up to the door of a roughly built house, which was but one story high and finished with a shed roof. A crowd of curious men and women were gathered around, and two children of the deceased, scarcely old enough to realize their great loss, sat cowering upon the rude steps. The dreadful story had been told the wife a few minutes before, and she sat upon the ground with her head upon her hands, weeping as if her heart would break. Before the first burst of grief had subsided the mangled body of her husband was before her. A blanket containing the shattered remains of what was once a strong, proud man was taken from the wagon and placed on the floor. An arm and a leg were missing, and the face was unrecognizable. Half the head was gone. The only way they knew it was Jack, was by the clothes he wore. He had lost his footing at the upper pump station, and when they found him he was cold in death.

When a man falls down a shaft, there is little else but shreds left of him, and he never knows what hurts him. The next day there was a grand funeral, attended by the members of the Miners' Union, but few could imagine the utter sorrow and despair of the scene in front of that miner's home the day before.

Death comes suddenly to the men who go into our mines, and when the cage descends with them they do not know that they will come out alive. Men, women and children in this community become accustomed to looking upon life as a matter of great uncertainty, and an accident which would startle many another neighborhood, is but casually commented upon here. It is not thought of so much importance as the stock market or the weather, and is lightly considered outside of the parties affected by it. Familiarity with scenes of danger and distress have rendered our people almost equal to the stoic philosophers of old, who held their pride above their pain, and cultivated a feeling of contempt for all manifestations of sympathy with human sufferings. This is the natural result.—*Gold Hill News.*

THE USE OF ORNAMENT IN CONSTRUCTION.—At a meeting of an English engineering society Mr. R. Blunt read a paper on "The Use of Ornament in Manufacture," under which title he spoke of two correlative subjects, viz., the place and use of ornamental beauty in structure and design, and the manufacture of ornamental work for such purpose. Taking the first question, he contended for the encouragement, wherever possible, of ornamental beauty in engineering structural work, contesting and criticising Mr. Ruskin's law (as laid down in several passages quoted from his works) that all ornament or decoration whatever is inadmissible in places of business and active life, and is to be confined to the beautifying of home. Passing to the second question as to the use of machine-made ornament, Mr. Blunt defended the employment of such work in default of hand-made sculpture against the charges of badness and dishonesty which Mr. Ruskin alleged against it. He then defined the proper place and purpose of good ornamental work in completing and aiding to harmonize the effect of the whole structure, and, while strongly condemning all badly designed, made and placed ornament, of which he gave illustrations, pleaded that it was largely in the power of engineers and architects to decide whether they would aid by their work in the encouragement of what was beautiful in shape and proportion or the contrary.

A SUPPLEMENTARY CONTRACT FOR THE POUGHKEEPSIE BRIDGE.—We have already announced, says the *Iron Age*, on the authority of the chief engineer of the Poughkeepsie Bridge Company, that work on that great structure is about to be resumed. A temporary stoppage of the work took place several months ago on account of differences arising between that company and the contractors, known as the American Bridge Company. It is satisfactory to know that within a few days these have been adjusted by a supplemental contract executed in this city, so that now all is harmonious, not only as between the respective companies, but a number of men who have been waiting for their pay will soon get their dues. The action just taken was made necessary in consequence of increased expense in carrying the foundations deeper than was originally contemplated.

WHAT EACH HAS DONE.—The United States stands first in telegraphy—79,000 miles; England second, 75,000. The telephone is American, as was the telegraph. We gave the world the steamboat, the telegraph and the telephone. England gave us the railroad.

MECHANICAL PROGRESS.

New Process of Steel Casting.

We read in the *American Manufacturer* an account of a new process of making irregular shaped steel castings such as plow-shares, out of fine tool steel, any desired percentage of carbon, without annealing, as in the ordinary "steel casting" processes. It is the invention of Mr. A. J. Nellis, of the Pittsburg agricultural works. In the ordinary method of making steel castings, it is necessary for the steel to be very high in carbon, in order to be fluid enough when melted to run into a fine casting, and the excess of carbon is removed after the casting is made by a process of annealing which requires from 10 to 20 days. By Mr. Nellis's method of making castings, low carbon steel, or ordinary tool steel, may be employed if desired. The mold in which the casting is formed is impregnated with combustible materials, which takes fire the instant that the melted steel comes in contact with the mold. An intense heat appears to be generated, which retains the steel in a perfect fluid condition till it reaches the smallest corners of the mold, and an agitation is caused by which all air and confined gases are allowed to escape from the metal, thereby making the casting free from blowholes. One theory of the action of this process is that the combustion of the materials with which the sand is impregnated consumes all the oxygen of the air within the mold, and the remaining gases have no "affinity" for the steel. The plow-shares made by this process can be forged into any shape required by an ordinary blacksmith, or after it is entirely worn out he may draw it down into tools and entlery. If the new process succeeds as well as it promises to do, we may soon see steel castings largely used instead of wrought iron or steel forgings for all difficult shapes. Mr. Nellis also has a patent on the mold used for his steel castings, which obviates the trouble experienced with iron molds, of the melted steel adhering to them on all sides, and causing shrinkage cracks, and has all the advantage which iron molds possess of durability and permanence of form. The molds are made chiefly of iron, but with inserted sections of sand. These sections do not adhere to the casting, and shrinkage can take place without hindrance, avoiding cracks or internal strains.

LATHE TOOLS AND TOOL POST SLOTS.—Robert Briggs writes for the *Polytechnic* some hints on lathe work which are of general interest. For the performance of a large quantity of work by the lathe, no greater necessity exists than for heavy turning tools. The numerous attempts of 30 and of 10 years since to use cutting points for turning have all ended in practical failure. No nicety of shape or fitness to meet the exact requirement for easy cutting of metals will recompense for want of material, both in continuity and in mass, to conduct away the heat of the cut and of friction on the cutting surfaces. The smallest working tool for turning iron should be $1\frac{1}{2} \times \frac{3}{4}$ steel in the shank, the slot of the tool post of the lathe, which swings 10° only over the ways, should take this dimension easily; $1\frac{1}{2} \times \frac{3}{4}$ steel is not excessive for tools for the 30 inch lathe, where profitable return for use of the lathe is expected. The posts themselves, with their gripping screws and bearing rings, can hardly be too heavy, while they can easily be too weak. For a 48 inch lathe it does no harm to have the slot in the post $2\frac{3}{4}$ or $3 \times 2\frac{1}{2}$, or $2\frac{1}{2}$, with a two inch screw. The refinement of spring tools for heavy cuts or for long cuts without a re-sharpening, are well enough for tool rests with V slides, or lathes where the ways have V's; but neither excellence of workmanship, nor speed of running, nor heavy cuts, will result from makeshifts of lathes, or of turning tools, however well the makeshifts may be contrived.

SEWING MACHINE MOTOR.—A Vienna mechanic has succeeded in constructing an apparatus for working sewing machines. Electricity, steam or water power are, on the score of cost, domestically inapplicable, so the inventor of the new machine was restricted to gravitation or elasticity, and he preferring the latter force, has contrived to make springs strong enough to keep an ordinary sized machine in motion, it is said for hours. A system of cog-wheels is arranged underneath the surface of the table upon which the machine is fixed, and by a handle at the side the spring is wound up with facility. The velocity at which the machine works is entirely at the option of the person using it, and can be easily regulated.

TYPOGRAPHICAL MACHINES IN NEW YORK.—We read that in one large printing office in New York city there are several type-setting machines in operation, on which the use of composing-sticks, and the trouble of banding them and adjusting the type, is avoided, the adjustment being done on the machine, which transmits the type directly on the galley, and rings a bell when the galley is full. The distributing machine, however, is the most difficult problem, and has been successfully solved here also. It requires no manual assistance, except to put into the machine the galleys with the pages on them. When the page is distributed a bell is rung and the machine stops until the next page is put on.

NEW SYSTEM OF PILE-DRIVING.—The *Journal of the Franklin Institute* says that the Messrs. Stoecklin & Vettillart, in their works for enlarging the harbor of Calais, found great difficulty in sinking the piles and planks through the fine, moist beach sand. The use of water to facilitate the penetration of broken iron piles suggested its use on the outside, and in advance of the wooden logs that they were using. By the use of two hand-pumps the sand was so loosened and held in suspension that the labor was greatly ebrided. On the old plan an average of 155 blows was required to drive a pile, 900 blows for a panel, requiring, on an average, 8 hours and 36 minutes. With the help of water injection the number of blows per panel varied from 0 to 50, the mean time being only 1 hour and 9 minutes; many of the panels required only from 14 to 16 minutes, and the longest time was only 1 hour and 45 minutes. The extraction of displaced or broken piles or planking, which has hitherto been attended with great difficulty, is accomplished with the greatest ease by the new system.

VELOCITY FOR CIRCULAR SAWS.—The *Manufacturer and Builder* says: That 9,000 feet per minute for the rim, on an average, may be laid down as a rule. For example, a saw 12 inches in diameter, 3 feet around the rim, 3,000 revolutions; 24 inches in diameter, or 6 feet around the rim, 1,500 revolutions; 3 feet in diameter, or 9 feet around the rim, 1,000 revolutions; 4 feet in diameter, or 12 feet around the rim, 750 revolutions; 5 feet in diameter, or 15 feet around the rim, 600 revolutions. The rim of the saw will run a little faster than this, because the circumference is a little longer than three times the diameter. Shingle and other saws, either riveted to a cast-iron collar, or very thick at the center and thin at the rim, may be run with safety at a greater speed.

AN IRON BUGGY.—An attempt has been made by an inventor, resident at Berlin, in the Maryborough district, Victoria, to introduce iron buggies into use. Mr. Alexander Jamieson has constructed a vehicle which consists exclusively of iron and steel. For instance, in place of hickory spokes and oak felloes, he has employed wrought-iron tubes and T iron. The tubes fit into the axle box at one end, and are riveted to the T iron at the other. The first noticeable effect of the employment of iron for all parts has been to add to the weight of the vehicle. This has accrued in spite of the thinness of the parts. The cost also has been enhanced. Strength and durability are regarded as a full equivalent for the increase of cost, and to belong to that form of expensiveness which proves cheapness in the long run. The vehicle, it is said, has a neat look, and an appearance (if not a reality) of lightness which renders it attractive.

BORING HARDENED STEEL.—In the "Journal suisse d'Horlogerie," 1877, p. 76, the following method is given: The drill is made oval pointed instead of having the usual form. It is hardened as much as possible without being burned. The surface of the steel to be drilled is next moistened with a little nitric acid, so as to make it a little rough. The drill is then applied and is from time to time moistened with oil of turpentine. Many workmen use instead kerosene or good rectified petroleum, in which previously a little camphor has been dissolved. When the drill acts no longer, clean the hole of chips with a little turpentine or kerosene and add nitric acid to roughen the smooth bottom of the whole, and proceed as before. This operation is, it is true, a little tedious, but it comes finally to the desired end and is the only safe way of boring hardened steel.

SIMPLE FORM OF BUNSEN BURNER.—*Dingler's Journal* says that this can be easily made of glass. A tube of glass, four or five inches long by one-third or one-half of an inch wide, is taken, and by blowing out the glass, beated at two points by the pointed flame, the air holes at the bottom are produced. The gas is introduced at the center of the bottom of the tube by an upward-bent glass quill tube, with the delivery end shaped like this cross x, a form well adapted to mix the rising current of gas with the air. This tube is fastened to the lamp by a foot, made of plaster of Paris, in which it is embedded. A short piece of glass tubing may be fastened by a rubber coupling to replace fractures. This lamp is much better for the flame reactions than the ordinary metal lamps.

MACHINERY RUNNING AT NIGHT.—The *Manufacturer and Builder* has timed the revolutions of wheels and found them actually the same night and day, notwithstanding all present in the shop imagined that they run faster at night. The simple reason is that by the stillness of the night, the motion of ponderous machinery appears more rapid and heavier, while in the day time it is partially drowned by other noises; this, acting on the imagination, causes the assumption of a greater velocity. Simply timing with a watch destroys the illusion.

THE LABOR ON A SHIP.—The following are the closing remarks of John Roach, when making a speech a few days since, after launching the iron ship *Rio de Janeiro*: Seven months ago the material for yonder vessel, which was launched a half hour ago, was lying in the bowels of the earth. There it was worth \$5,000. Today, in its present shape, it represents \$500,000, and that money has gone to the elevation of American labor.

SCIENTIFIC PROGRESS.

Atmospheric Ozone.

In a lecture by Prof. Leeds at the Stevens Institute of Technology at Hoboken upon "Ozone and the Atmosphere," the lecturer announced the results of a series of analysis of the atmosphere, and compared them with those executed by Regnault, Bunsen and other European chemists upon the composition of the air in other parts of the world. The samples of air had been collected on various occasions upon the grounds at the Centennial Exhibition at Philadelphia, and in the different Centennial buildings. During the same summer samples were collected in New York, Brooklyn, Hoboken, and upon many of the Adirondack mountains. Beside these samples, beginning with one taken on the 4th of July, 1876, others were being collected and carefully preserved, with the design of transmitting them to some chemist of the future who, by analyzing them with improved methods at the lapse of a century, might be better able to decide what is still a matter of assumption, that there are no causes in operation to produce a slow secular change in the constitution of the earth's atmosphere. The ordinary statement that the air has an invariable composition is not strictly true, because no two samples of air collected at different times and places are absolutely identical; and a decrease which appears numerically insignificant in the percentage of oxygen becomes of grave importance when the deficiency, as is usually the case, is made up of less beneficial ingredients. Attention was called to Schonbein's immortal discovery of ozone in the gas which is liberated on the decomposition of water by a galvanic current, was illustrated to the audience by projecting an image of this decomposition on the screen. The liberated ozone carried over into liquids, which showed its presence by striking changes in color and properties.

A new machine was exhibited for the production of ozone in large quantities and in a very concentrated form. The oxygen, after cooling to zero, was deprived of every remaining trace of moisture by powerful drying agents, and then finally passed through tubes highly electrified. The instantaneous bleaching of indigo, the oxidation of silver and other minerals demonstrated the intense chemical energies of ozone so formed. In conclusion, Prof. Leeds pointed out the necessity of systematic observations upon atmospheric ozone in all parts of this country, and the great value of such observations in relation to the growth and spread of disease.

THE COMING TRANSIT OF MERCURY.—A good deal of interest, says the *Independent*, is felt by astronomers in the transit of Mercury, which is to occur on the 6th of May and will be visible all through the United States. The observations of this phenomenon will have a considerable value, by themselves considered, as giving a very precise determination of the planet's place; thus furnishing a severe test of the accuracy of Leverrier's tables, and consequently of the reliability of his conclusions respecting an intra-mercurial planet or groups of planets. But the chief importance of the observations lies probably in their bearing upon the observations of the transit of Venus. The optical appearances must be nearly identical in the two cases; and, hence, a transit of Mercury affords excellent practice in the way of preparation for the more important event. By the liberality of a French banker, who appropriated 30,000 francs for the purpose, Messrs. Andre and Angot, French astronomers of distinction, have been sent to this country, to make the necessary observations, and will take their station at Ogden, on the Pacific railroad.

PULSES BY TELEGRAPH.—*Appropos* to a lecture in England on the telegraphing of pulse beats the editor of the *Manufacturer and Builder* remarks: This reminds us of the pleasure we enjoyed when at the meeting of the American Association for the Advancement of Science, at Salem, Mass., in 1874, the different beats of the pulses of various patients in the Boston City Hospital were made audible by telegraph in Salem to a large audience. The difference of the pulses in patients laboring under attacks of pneumonia, phthisis, fever and ague, etc., was quite marked, and perfectly satisfactory to give data by which to recognize the disease. Making the vibrations also visible is a step in advance.

RELATIVE SENSITIVENESS OF VARIOUS TESTS FOR ARSENIC.—The Marsh apparatus detects 0.0003 m. g. of As_2O_3 dissolved in 150,000,000 times its weight of water. The method of Von Baho and Fresenius detects 0.002 m. g. of As_2O_3 That of Reinsch by copper, 0.001 m. g. of As_2O_3 in 5,000,000 times as much liquid, and Rieck's method by ammonio-nitrate of silver detects 0.002 m. g. in 3,000,000 parts of water.

DELICATE TEST FOR VAPORS OF MERCURY.—*Comptes Rendus* says that paper impregnated with mixed chlorides of platinum and palladium give a brown coloration when exposed to vapor of mercury. It is found by this test that mercury volatilizes even when frozen. Salts of gold and silver are sensitive also, but not to the same extent. The scientific and industrial applications are evident.

Cheese and the Microscope.

At the last meeting of the San Francisco Microscopical Society, Mr. E. J. Wickson, editor of the *Pacific Rural Press*, asked the attention of the members to a slide containing sections of ordinary full cream cheese and cheese made by introducing oleomargarine into skimmed milk. He described the process of making oleomargarine cheese, namely, by removing the cream from the milk, and then stirring in liquid oleomargarine to supply the fat removed in the cream. The mass is agitated and rennet enough added to form a curd quickly before the oil can separate from the skim milk. The aim of the process is to form an emulsion of oil and a menstruum of soluble casein, like that which exists in natural milk. This process has succeeded so well that chemical analysis has shown the artificial cheese richer than the genuine, and so great an improvement on skimmed cheese that large quantities are sold in New York and shipped to Europe. Mr. Wickson stated that he had studied this artificial cheese with the microscope, and found that the emulsion made by the cheese-maker was not nearly so perfect as that made by nature in the cow, and therefore it was easy for a microscopist to distinguish between the two products. In the slide which was shown the two sections of cheese were in juxtaposition. The cheese made from full cream milk was seen to be of close texture, and the natural fat was incorporated in the substance. The oleomargarine cheese showed cavities of irregular shape in which the artificially introduced fat was imprisoned when the curd formed. The difference simply consists in the results of an imperfect emulsion in which the fat exists in masses rather than in globules, as in milk. Mr. Wickson remarked the difference between the cavities usually formed by gas in full milk cheese and those which held the oil in oleomargarine cheese. He stated that he first pointed out the characteristics of the two makes of cheese, and regarded the microscope as an infallible detective of the true qualities of cheese.

ENTOMOLOGY AT PARIS.—The Societe Centrale d'Agriculture et d'Insectologie has erected in the Champ de Mars an appropriate building, in which an extensive and exhaustive exhibition of all that relates to the breeding of useful and the destruction of injurious insects will be held during the present year. This building in which will be reproduced on a much larger scale the collection actually existing in the Luxembourg gardens, is to be, after the International exhibition, transferred to the Place de Montsouris, in the center of an area of 2,000 superficial meters, which will be exclusively devoted to exhibitions, and public lectures on agriculture and insectology. Dr. Marmottan, President of the Societe Centrale, and M. Hamet, the general secretary, have to that end, opened negotiations with the Paris Municipal council, who, however, hesitate to grant the use of the site in question, in case the neighborhood of the bees would inconvenience passers-by. This, however, is likely to be obviated, the scheme has all prospects of being successfully carried out.

COMBINATION OF NICKEL WITH CARBON AND SILICON.—E. Gard (*American Journal of Science*, Vol. 14, p. 294) has analyzed three buttons of nickel, which were produced by melting commercial nickel with carbon. They gave the following results:

Nickel.....	98.203	98.392	97.440
Carbon.....	0.530	1.104	1.990
Silicon.....	0.303	0.130	0.255
Iron.....	0.464	0.108	0.301
Cobalt.....	0.446	trace	trace
Sulphur.....	0.040	0.266	0.104

He further mixed pure oxide of nickel with powdered quartz and wood charcoal and heated to melting. The resulting white metal contained 9.3% carbon, 6.6% silicon. Commercial nickel melted in a Hessian crucible with charcoal gave 2.12% carbon.

NEW COOLING AGENT.—According to *Les Mondes*, Ch. Tellier has used trimethylamine for the production of cold, under conditions which lead him to regard it as the best known frigorific. Vaporizing at $+8^\circ C$, under ordinary pressures, it requires a pressure of from one to two additional atmospheres to relify it. This property allows us to utilize waste heat, especially the waste steam of manufacturers, so that the cost of the refrigeration is limited to the bare expense of superintendence. A degree of cold equivalent to that produced by the consumption of 10,000 kilogramme of ice, can thus be obtained for a few francs.

ON DETERMINATION OF CHLORINE.—H. Pellet in "Bulletin de la Societe Chimique de Paris," 1877+28 p. 68, shows that in the titration of chlorine by means of nitrate of silver, with potassium chromate as indicator, that (the presence of) arsenic, arsenious and phosphoric acids, as also fluorides, does not interfere with the reaction. Hence, in determining chlorine in ash and the like, it is not necessary to previously remove phosphoric acid.

SEPARATION OF ANTIMONY AND ARSENIC.—The well-known method of Bunsen's for separating arsenic and antimony, by means of the insolubility of the sulphide of the latter (Sb_2S_3) in potassium disulphide, has been attacked by L. F. Nilson, a Swedish chemist ("Zeitschrift fur Analytische Chemie," 1877, S. 417.) He maintains that the antimonious sulphide is not insoluble in the reagent used, and that this (neat and useful) method is unreliable.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

OTHER COMPANIES NOT ON THE LISTS OF THE BOARDS

MEETINGS TO BE HELDLATEST DIVIDENDS—WITHIN THREE MONTHS

California Board—Latest Sales.

420	Combination	150	30	Gila	.....	85c			
425	Day	.....	30	500	Gould Terra	.....	2.10		
430	Day	.....	30	250	Gould Curry	.....	1.00		
160	Eureka Con.	55	1745	Hussey	.....	50c			
500	Endowment	651	200	Hornet	.....	10c			
400	Honestake	.....	5	300	Hale & Nor.	.....	91		
400	Horn	.....	7	100	Hale & Nor.	.....	91		
700	Independence	.....	7	1745	Hillside	.....	1.00		
30	Jackson	.....	3	500	Indep.dent.	.....	95c		
505	Justice	4205	840	Julia	3.10	23.05			
150	Leopard	45	50c	100	Jackson	.....	34		
250	Leopard	.....	2.85	40	Jackson	.....	34		
230	Mexican	.....	2	130	Mexican	.....	91	39	
650	New Coso.	1.35	410	630	Modoc	2.90	2.95		
350	Navajo	55	50c	100	Martin White	.....	41		
270	Northern Belle	61	45	245	Manhattan	.....	91	29	
400	Overman	.....	26	40	Ophir	.....	3		
140	Overman	10	40	30	Northern Belle	.....	7		
400	Panther	25c	1115	Navajo	.....	80	85c		
10	Phenix	.....	4	415	Ophir	.....	281	273	
55	Raymond & Ely	.....	3	240	Overman	.....	121	205	
250	Star	.....	1.00	100	Savage	.....	25		
300	Star	.....	1.50	100	Raymond & Ely	.....	31		
100	Silver King	.....	15	955	Sierra Nevada	41	24.05		
130	Savage	12	123	260	Savage	.....	131	113	
55	Sierra Nevada	4	10	1050	Silver Prize	.....	1.40		
75	Succor	.....	65	70	Succor	.....	1.00		
250	Tiptop	11	21	60	Tiptop	.....	1.90		
100	Ward	.....	90c	220	Utah	.....	101	101a	
235	Yellow Jacket	61	61	125	Young America	.....	35c		
Wed'sday A.M. April 24									
10	Alta	.....	8	55	Alexander	.....	8	71	71
50	Alexander	.....	8	55	Best & Belcher	.....	15	11	15
30	Bullion	.....	4	75	Belcher	.....	5	60	65
50	California	.....	27	100	Baltimore Con.	.....	50c		
50	Con Virginia	.....	15	30	Caledonia	.....	2.05	2.10	
910	Con Imperial	.....	50	30	California	.....	261	223	
110	Exchequer	.....	2.60	2.80	Con Virginia	.....	15	15	15
90	Hale & Nor.	.....	91	30	Exchequer	.....	2.65	2.55	
520	Hussey	.....	50	545	Gold & Curry	.....	71	27	
85	Hale & Nor.	.....	92	100	Gold & Curry	.....	71	27	
100	Justice	.....	61	40	Hussey	.....	43	50	
115	McKenzie	.....	91	115	Hale & Nor.	.....	41	59	
70	Wells Carson	.....	27	28	Justice	.....	61	59	
70	Ophir	.....	3	30	Hale & Nor.	.....	41	59	
20	Overman	.....	123	30	Leviathan	.....	22	20	
200	Pictou	.....	80	90	Mexican	.....	91	91	
140	Panther	.....	10	140	Overman	.....	11	11	
155	Savage	.....	13	131	Overman	.....	11	11	
50	Sierra Nevada	15	15	20	Pictou	.....	85c		
200	Spaulding	.....	1.20	22	Spaulding	.....	1.20		
200	Troian	.....	45c	60	Sierra Nevada	4	10	54	
100	Wells Fargo	.....	3	40	Savage	.....	131	113	
10	Yellow Jacket	.....	62	225	Silver Hill	.....	1.05	1.10	
AFTERNOON SESSION.									
60	Alpha	.....	81	60	Union	.....	4.40	4.35	
10	Yellow Jacket	.....	61	10	Yellow Jacket	.....	61		

Mining Share Market.

Pacific Board—Latest Sales

Notwithstanding the eagerness with which the developments going on in the Savage and Julia have been watched, the past week has seen a steady and quiet market, all hold movements being kept in check by the uncertainties of the situation. With this tension very little of a determinate character would suffice to effect prices sharply. As explorations in these two mines progress this feeling of expectancy will be intensified until the denouement brings with it such a change of prices as only final results can effect. Meantime there is a growing confidence in the importance of the ore bodies crosscut in these mines. Great will be the disappointment should they ultimately fail to take on the genuine bonanza type; and while there is no certainty that they will do so, we have yet to be furnished with an instance on the Comstock belt in which these deep lying mineralized bodies have failed to afford large quantities of valuable ore. The theory that the ore now coming in on the 1600-foot levels of the Julia and Savage lies in a more easterly channel than that first opened on the Comstock appears to be growing in favor.

Wednesday A.M., April 24	50 Ward.....	91c
125 Alta.....	50 Yellow Jacket.....	61
100 Bullion.....	77@71	
200 Andes.....	360 Alta.....	77@71
150 Belcher.....	200 Andes.....	27@28c
50 Bullion.....	200 Belmont.....	75@85c
70 Best & Belcher.....	10 Best & Belcher.....	15
100 Best & Belcher.....	70 Calcutta.....	2 1/2@2 3/4
125 California.....	90 California.....	27@28 1/2
250 Con Virginia.....	150 Con Imperial.....	50c
60 Chollar.....	670 Con Virginia.....	15@16
30 Caldenia.....	30 Exchange.....	2.65
100 Con.....	300 Exchange.....	4.60
100 Con Imperial.....	400 Grand Prize.....	4@4 1/4
100 Dayton.....	200 Hussey.....	50@45c
90 Gould & Curry.....	110 Hale & Norcross.....	58@60
15 Hale & Nor.....	50 Leopold.....	35c
100 Bathy.....	50 M. A. N.....	3
15 Justice.....	100 Modoc.....	3
29 Kentucky.....	200 McCracken.....	41
35 Mexican.....	50 New Cosco.....	1.20
206 New York.....	100 New Potosi.....	60c
100 New York.....	100 Ophir.....	30c
10 Overman.....	200 Panther.....	30c
Pictou.....	250 Pictou.....	30c
220 Savage.....	490 Savage.....	13@13 1/2
200 Succor.....	50 Silver Prize.....	35c
100 Succor.....	500 Silver.....	30c
150 Sierra Nevada.....	20 Sierra Nevada.....	4.20
855 Trojan.....	110 Trojan.....	36c
110 Union Con.....	300 Union Con.....	4.40@4 1/2

M Co	J W Morgan	318 Pine st	Annual
avcl M Co	F Klostermann	309 California st	Special
& S-M Co	B F M Benson	120 Sutter st	Annual

440	California	27	405	Con Virginia	15
335	California	2	410	California	26
335	Calphobos	2	400	Calphobos Point	2
365	Exchequer	0	500	Day	50
930	Gould & Curry	7	226	De Frances	20
355	Hale & Nor	8	200	Eureka Con	50
905	Justice	3	350	Endowment	55
420	Alta	3	200	Talco	3
12	Kent	3	700	Grand Prize	4
185	Mexican	91	905	Gould & Curry	7
400	North Con Vir	10	1000	Golden Tree	4
150	New York	30	120	Golden Chariot	40
535	Old Silver	70	14	La	75
200	Ohio	20	265	H & Norcross	8
700	Sierra Nevada	4	70	Hamburg	3
2025	Savage	13	350	Hillside	5
200	Solid Silver	2	200	Imperial	2
150	Union Can	4	200	Jackson	3
140	Succor	1	30	Leovard	35
100	Senator	3	50	Manhattan	5
850	Trojan	50	320	Motoc	3
250	Union Con	4	30	Patella	3
25	Woodville	35	335	New Coso	1
40	Ward	95	275	Navaio	55
400	Yellow Jacket	1	105	Ohio	28
AFTERNOON SESSION.					20
25	Alta	8	500	Pathe	20
500	Argenta	15	200	Raymond & Ly	1
160	Belcher	3	640	Savage	13
150	Bullion	4	450	Silver King	3
640	Bechtel	1	700	Silver Pine	3
100	Belmont	55	800	Silver Pine	3
650	Belmont	55	255	Tiptop	1
440	Best & Belcher	15	500	Union Con	4
85	Con Virginia	15	350	Yellow Jacket	6
SALES OF LAST WEEK AND THIS COMPARED					
Thursday A.M. Apr. 18.					Thursday A.M. Apr. 25.
30	Alta	30	10	Alta	8
1030	Alta	3	10	Alta	8
160	Alpha	7	120	Best & Belcher	15
505	Best & Belcher	13	240	Bullion	4
640	Belcher	3	400	Beuton	3
350	Benton	13	300	Beuton	3
265	Bullion	3	1035	Con Imperial	3
100	Boyc	40	248	California	26
450	California	27	555	Con Virginia	15
1700	Con Virginia	16	210	Con Virginia	15
250	Columbia	10	245	Corn Point	2
230	Crown Point	4	330	California	2
3910	California	3	1450	Con Washoe	7
745	Con Imperial	40	200	Confidence	20
540	Con Washoe	8	340	Confidence	20
380	Exchequer	2	570	Gould & Curry	7
2100	Gould & Curry	7	515	Hale & Nor	8
615	Hale & Nor	9	910	Julia	2
150	Julia	3	330	Justice	5
220	Kent	3	500	Leviathan	5
470	Mexican	91	10	La	75
200	New York	75	10	La	75
50	North Con Vir	20	340	Mexican	9
845	Ohio	20	465	New York	30
330	Old Silver	70	20	Overman	11
2000	Rough & Ready	1	450	Succor	70
2005	Savage	13	430	Sierra Nevada	4
965	Sierra Nevada	4	1165	Savage	13
670	Silver Hill	85	1165	Savage	13
770	Silver Hill	85	10	Sez Belcher	20
775	Succor	70	330	Trojan	35
1850	Trojan	55	110	Utah	9
100	Utah	10	430	Wells Fargo	3
585	Union Can	4	200	Wells Fargo	3
500	Wells Fargo	3	235	Yellow Jacket	6
50	Woodvil	35	AFTERNOON SESSION.		
100	Wells Fargo	3	850	Alta	7
475	Yellow Jacket	6	200	Argenta	15
AFTERNOON SESSION.					
440	Alta	3	95	Belcher	3
600	Argenta	30	205	Best & Belcher	15
230	Belle Isle	30	100	Belmont	70
700	Boyle	12	400	Bullion	4
410	Best & Belcher	15	555	California	26
375	Bechtel	1	550	Con Virginia	15
225	California	27	550	Crown Point	2
320	Con V	16	550	Day	50
400	Con V	16	14	Eureka Con	50
200	Con V	16	265	Exchequer	2
200	Con V	16	100	Endowment	55
200	Con V	16	100	Grand Prize	4
200	Con V	16	185	Gilg	70
200	Con V	16	200	Golden Tree	4
200	Con V	16	1000	Gould & Curry	7

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

BUTTE.

THE DREDGE BOAT.—*Mercury*, April 19: The mining boat owned by the Marysville company is now on its way down the river to ground owned by W. S. Higgins, where it will be put to work in the hope of striking it in paying quantities.

THE PROOF.—Gold is coming out of the mountains by the thousands each day that the stages comes into Oroville.

CALAVERAS.

SHEEP RANCH.—*Citizen*, April 13: This is an active and growing camp. The Sheep Ranch mines never ceases by night or day. This valuable mine now gives employment to more than fifty men—thirty of them working in the shafts by day, and about a dozen by night; the remainder are employed at the hoisting works, the mill, etc.

The Boston hydraulic company have a large force employed on Whisky hill. The immense reservoir in Salt Spring valley was filled during the winter and will furnish water to keep them at work all summer.

COMMENCED CRUSHING.—The new mill on the Hughes' mine near Chile gulch was started last week. A sufficient amount of ore, it is thought, will be obtained to keep the mill running continuously.

EL DORADO.

KELSEY.—*Mountain Democrat*, April 20: Quartz mining is receiving considerable attention. Things are being put in shape to further prospect the Chaparral mine, on which a good deal of work has already been done. Operations are in progress on the Ida Livingston, owned by San Francisco parties. Hoisting works with power sufficient to meet all demands has been erected, and no expense has been spared to thoroughly prospect this ledge.

ST. LAWRENCE.—There is a rumor that work on this mine is shortly to be resumed, only enough having been done here for some time past to keep it free from water. The present company have already expended considerable money upon it, and when we remember that in times past it proved a veritable bonanza to its owners—the present company also taking out ore which yielded handsomely—it seems entitled to a further trial.

THE CHURCH UNION.—This mine, near E Dorado, is looking better than ever before. The ledge is widening. They are drifting now on the 500 level and will soon begin sinking again. The mill will soon start to continue through the summer. Work will be resumed in the Pocahontas mine in a few days.

INYO.

BEVERIDGE DISTRICT.—*Independent*, April 13: The new gold district just across the summit from the Eclipse is attracting some attention. The first discovery was made in November last, by Wm. L. Hunter and others. The discoverers have kept a small force at work throughout the winter, and do not hesitate to pronounce the mines and whole district most promising. The snow is rapidly melting away, and as it goes the work of prospecting becomes possible. Up to the 8th instant 23 claims had been located, "each giving rich prospects of free gold." The country is well watered and timbered, and of the roughest description. Via Cerro Gordo is at present the only practicable route to the new mines.

NEVADA.

SELBY HILL.—*Transcript*, April 19: The claim on this hill worked for the past two years by hydraulic process, will now be worked by drifting, a tunnel having been run for the purpose and which has reached the rich channel. The reason for this change is that there was so much pipe clay in the claim, that it could not be worked by piping, this tenacious stuff carrying away so much of the gold. Drifts will be run from various points along the main tunnel, and the rich gravel, which is always found on the bedrock, will be stopped out, and washed in sluices, from which it will be pumped into a reservoir, where it will be allowed to slack for some time, when it will again be washed. The second washing yields nearly as much as the first.

THE BYRNE MINE.—*Grass Valley Union*, April 16: This mine on Gold Flat comprises 120 acres, 80 of which are gold-bearing gravel, through which runs a lead known to be rich from the ground that has been worked on the edge of the channel. The main features are the two quartz leads, the Potosi and Mohegan. The Potosi has been worked to the depth of 300 feet by one shaft, and 250 feet by another.

THE CENTENNIAL.—On the lower or 320 level of this mine rich rock is being taken out. The vein shows from ten to twelve inches in size, and regular. The Orleans mill will commence another crushing of ore from the mine next week.

PLACER.

REMINOTON HILL.—*Dutch Flat Forum*, April 19: The Rhode Island hydraulic mine is running off rich gravel. A small boulder was picked up in this claim lately that contained several hundred dollars' worth of gold. As the water here does not last long they will not clean-up till the end of the washing season, to

wards the close of next month. The Wide West drift claim is being extensively opened, working from 20 to 30 men and breasting out large blocks of good gravel.

LOWELL HILL.—At the Swamp Angel 25 men are being worked, drifting out very rich gravel. The East New York tunnel is completed a distance of 1,000 feet. The Planet tunnel is in 940 feet, and though now under the channel the incline will not be raised till the 1st of May. The Wild Cat tunnel is in 1,700 feet, and it is thought they are passing over the channel.

LIBERTY HILL.—The hydraulicing of the upper and lower strata in the Liberty Hill mine has been progressing steadily—washing night and day most of the time since January 26th.

DUTCH FLAT.—The Polar Star and Southern Cross, although not nearly opened as yet to be worked to advantage, surprised the managers at a recent clean-up by paying over running expenses. Seventy men are employed and 1,600 inches of water used alternately. The second clean-up was made in the Central mine last week, which resulted in the payment of a dividend of more than \$4,000. The Lekaup mine is run by a force of five men, and 350 inches of water. This is probably the only mine in the district where miners receive or are paid the old rats of wages. The Boston mine is not being worked through the bedrock tunnel for the present. A string of pipe 700 feet in length, is being laid for the purpose of working a large bench of gravel on the outside of the rim rock.

SISKIYOU.

THE EMPIRE QUARTZ MINING CO.—*Yreka Union*, April 13: The Empire quartz mining company have contracted for the iron work of the quartz mill they are going to erect at their mine, and building will soon be commenced and pushed ahead as fast as possible.

TUOLUMNE.

THE MINES.—*Independent*, April 20: At Columbia miners are obliged to watch their claims by night, in company with shotguns and pistols. A partial clean-up at Philadelphia diggings, on Friday, after 18 days' run, paid \$430.37. Twenty-four men are repairing the damage of last winter to the Phoenix reservoir. It may take them a month longer or more to finish. All the water the miners want this season can be furnished by the Tuolumne County Water company; enough until next winter.

NEW DITCH.—The Soulsby company have contracted for a new ditch to course around the mountain to run the works at their mine.

PLUMAS.

RUNNING FULL BLAST.—*National*, April 13: The miners almost all over the country are hard at it, having all the water they can manage. The big ditch is full, with a prospect of having plenty of water until the first of September. They are running the Metcalf and Haycock claims, on Gopher hill, the latter day and night, and will move a very large quantity of ground this summer. The claims are known to be rich and the company will certainly realize a large sum of money this year. At Hungarian hill the pipes are at work, but as their water comes from the north side of the mountain, it is still light. The warm weather, however, will soon bring it along, and there ground is sure to respond liberally. All the miners of the East Branch and North Fork have had water for some time and are making good use of it. Jo. Kelly came down from his Popular Creek mine on Thursday. He says work is starting up briskly in that section, and thinks that a rich mining district is sure to result.

The Bell's Bar blue gravel company are getting out the timbers for the engine house. The machinery is now at Reno, and will be shipped to the mine in a few days. They have fine prospects for a big paying mine, and think they will get it in a short time. The Blue Gravel company, near Nelson are said to be taking out rich dirt.

SHASTA.

FURNACEVILLE.—*Reading Independent*, April 18: The Afterthought company have got to work again; having added some new machinery, whereby they get, through the leaching process, much finer bullion than before. The ore continues good and plentiful. They have a good, well managed property and can hardly fail to do well. A large mill will be put up, this season, on the Peck mine.

COPPER CITY.—There are no idlers here, more houses are needed and the saw mill of the Extra mining company is kept busy furnishing lumber. This company are grading and laying the foundation of their mill, the location of which is very advantageous.

FROM WHISKEY.—Bell, Knox & Woodward, crushing with an arrastra, cleaned up, not long since, 160 ounces of gold. Since which they have cleaned up \$1,340, the result of 18 days' run. Mr. Stone is sinking a shaft on a quartz ledge, about 600 yards east of the above mine, and is taking out of the vein some very fine ore. Mr. Banghart is working a seam mine about one mile east, and it proves to be among the best paying gold mines in the county. Mr. Peckham, two miles further east, is working quartz that yields him \$40 to the ton.

HARDSCRABBLE.—Robt. Harvey is putting in another pipe to work the claim north of Hardscrabble, which until lately was worked by Chinamen.

Nevada.

WASHOE DISTRICT.

SAVAGE.—*Gold Hill News*, April 24: Superintendent Gillette returned the first of the week

from San Francisco, where he had gone to consult with the President as to what course he should pursue in the development of the ore discovered on the 1540 level. He at once started two drifts, one north and the other south, alongside and parallel with the ore vein. The drifts are on the west side of the ore and are not intended to cut the ore at all until a proper distance is reached on either side of where the ore was found, when the main drift will be again started up and the vein be cross-cut at the same time both north and south of where it was first struck. At present nothing more is known of the real value of the strike than was known a week ago. The east drift on the 2000 level is steadily advancing, the face now being in much softer ground.

OPHIR.—Sinking the winze below the 1900 level is going steadily ahead, the bottom still in vein porphyry, the ore having passed out on the east side of the winze. A considerable quantity of quartz and vein matter has been passed through by west crosscut No. 4 from the east lateral drift on the 1900 level. The east drift on the 1800 level is now in 427 feet, having passed the point at which the new ore vein should have been found, if it extended up to that point, without developing anything of value.

CALIFORNIA.—Daily yield, 650 tons of ore. Good ore is being taken from every breast from the 1500 down to the 1750 levels. On the 1950 level the east drift is steadily advancing, the face still in dry vein matter showing some very fine stringers of quartz. A drill is kept well in advance in this drift to prevent a sudden influx of water, as this drift is some distance below the depth yet attained by the C. & C. shaft. The south drift on the 1750 level is still advancing in good ore. Another east crosscut, No. 6, has been started on this level, which is now in 26 feet, the face in vein material.

CON. VIRGINIA.—Daily yield, 600 tons of ore. On the 1850 level the crosscut west from No. 2 winze is being steadily advanced, the face still in vein material. No work is now being done in the main south lateral drift on this level. On the 1750 level a crosscut east has been started to prospect the ore vein opposite where the station was cut out for making the upraise to the level above. The face of this drift is still in vein matter.

JUSTICE.—The ore is being closely assorted as it is taken out, and about 130 tons daily shipped to the Pacific mill, which is kept steadily running. The ore stops from the 800 down to the 1000 level continue to show well, and yield good ore. The two east crosscuts on the 1000 level in the southern portion of the mine, are steadily advancing, and show some very favorable bunches of good ore.

YELLOW JACKET.—Sinking the new shaft is making excellent progress, the bottom in good working ground. It is now down 1,400 feet. The erection of the new pumping machinery is going steadily forward.

GOULD & CURRY.—The water is entirely drained from the 1900 level, and clearing out and repairing the south drift connecting the Savage joint winze below the 1900 level, is being pushed ahead with steady vigor, notwithstanding the intense heat.

CHOLLAR COMBINATION SHAFT.—Sinking the Chollar-Norcross-Savage shaft is being pushed ahead at a steady and very rapid rate. It is now down 2,135 feet, the bottom in porphyry that blasts well.

BEST & BELCHER.—Some quartz of a very favorable look has been passed through the past week while sinking.

OVERMAN.—Sinking the main shaft is making the best of progress, the bottom in good blasting ground. It will be down to the 1600 level by Saturday next, if nothing unusual happens to prevent. The face of the east drift on the 1100 level is showing some stringers of good quartz, although it is not in far enough yet to strike the body of quartz and ore found in running the east drift on the 1200 level.

LADY WASHINGTON.—The north drift on the 1000 level is steadily advancing along the foot wall of the ore vein, the face still in quartz and vein matter of a most favorable character.

BULLION.—The east drift on the 1840 level is being pushed vigorously forward, the face in quartz and vein matter of a better description than anything that has heretofore been found on this level of the mine. This quartz is entirely to the eastward of all the old workings, and is something entirely new.

JULIA CON.—The south drift on the 2000 level could hardly make better progress. It is being advanced at the rate of eight feet per day, and is following the west wall of the ore vein.

BELCHER.—Sinking the main incline is going steadily ahead, the bottom in good blasting ground. It is now down 135 feet below the 2260 foot station, and is being pushed vigorously downward to reach the 2360 level. The station for the winze below the 1900 level to connect with the south drift on the 2160 level is finished and the sinking commenced. Otherwise no changes of importance to note.

GOLDEN STANDARD.—This mining claim consists of 1500 lineal feet, lying just east of and parallel with the Homestead mine, Gold Hill. It is being opened and developed by the joint improvements and excavations of the two mines, and the Wheeler, near by.

WARD.—The west drift on the 1050 level is steadily advancing, the face in vein matter carrying quantities of quartz gravel of a very favorable look.

LEVATHAN.—During the week an increase of

quartz in streaks has manifested itself in the incline below the 600 level.

CALDONIA.—The face of the main north drift on the 1000 level continues in lively vein material. The east crosscut on this level has passed through the belt of hard rock recently encountered and is now in a much softer and more favorable character of rock.

SUTRO TUNNEL.—Important ore developments are to be expected at almost any time, for the tunnel has arrived nearly to its destination. Total length, last evening, from mouth to face of header, 19,489 feet.

CROWN POINT.—The connection by means of the north drift with the Yellow Jacket mine is now completed and this drift in good working order. The main south drift on the 500 level is steadily advancing, without any change of interest to report.

NEW YORK.—The face of the north drift on the 1000 level continues in a splendid character of quartz, which shows occasionally small streaks of good ore.

HALE & NORCROSS.—Everything is working well and draining the water is making better progress to-day than it has ever done since it was first tapped.

ALTA.—The north drift on the 1150 level is being steadily advanced, the face still in quartz and ore. The west drift on the 1250 level is rapidly approaching the main ledge, and some lively developments may be looked for on that level soon.

SIERRA NEVADA.—The new station in the south winze at the 2000 level is about completed. This is being opened in very favorable vein matter.

SUCCOR.—The northwest drift on the 1050 level is steadily advancing, the face in quartz and vein matter of a very encouraging character.

MEXICAN.—The joint east drift on the 1600 level is being steadily advanced, the face in very favorable working ground.

UNION CON.—The joint east drift on the 1600 level is being pushed vigorously forward, the face in a good character of vein material.

AURORA DISTRICT.

WILL BE A GOOD CAMP.—*Elko Post*, April 6: Parties who have lately visited this locality have favorable opinion of its future. No considerable amount of work has been done on any claim in the district, but the ledges are large, the ores very rich, and many of the claims which have been located and recorded will be developed during the coming season. The most prominent mine there is the Astor, formerly known as the Aurora. No work is being done on it at present, owing to a suit for possession now pending in the District Court at Elko.

BELMONT DISTRICT.

THE MINES.—*Courier*, April 6: In the El Dorado South a fine body of ore has been uncovered in the 950 drift, car samples assaying from \$250 to \$300 per ton. Drift No. 2, north end of the Belmont mine, will produce many hundred tons of first class ore. Rich sulphurets and antimonial silver are being developed in considerable quantity in other parts of the mine, the prospects of which are now considered excellent.

KEPT GOING.—*Courier*, April 13: Work on the El Dorado South and Belmont is steadily advancing, with improving prospects. Both companies are extracting rich ores, rendering it advisable that one of the 20-stamp mills should be started up. With the ore afforded by these two mines and what the chlorides can furnish, the mill could be kept running constantly. As soon as they commence to ship bullion, capital will seek investment in those mines which have lain idle so long in this section.

EUREKA DISTRICT.

NOTES ON THE MINES.—*Sentinel*, April 12: Over 200 men are employed at the Richmond furnaces and refinery, and that place is about as busy a locality as can be found in this section of the country. Capt. Foley is engaged in developing some new locations at Secret canyon, and is confident that he will encounter good mines at that point. The Richmond furnaces are averaging an output of 50 tons of crude bullion daily. The ores carry a very high percentage of lead. As soon as the necessary connections can be made the Connolly mine will ship large quantities of ore to the Richmond furnaces. Work is being renewed with vigor on a number of the small mines on Prospect mountain, where operations during the winter were retarded by the heavy snow fall in that locality. The Hamburg company will probably build smelting works this summer on their site in Eureka canyon. The sinking of the shaft at the Gray Eagle is being rapidly pushed, and the developments are looked upon as most favorable. Developments in the Palisade coal mine still continue, and the stockholders are confident that they are the owners of a first-class property. From 15 to 25 car-loads of lead and crude bullion, aggregating over 1,200 tons, are shipped from Eureka every week, the value of the refined bullion shipped weekly by express amounting to about \$150,000.

EUREKA CON.—*Sentinel*, April 19: The ore body on the seventh level is improving in quality, and promises to be one of the most important developments ever encountered in the mine. They will build an additional furnace of the old style very soon, the mine being able to supply any quantity of furnaces with ore.

THE HAMBURG.—The dumps are full of ore, and a large quantity is broken down in the mine that has not been hoisted to the surface.

Continued on page 268.

The Medicinal Springs of California.

From an interesting article in the *Pacific Medical and Surgical Journal* for April, written by John S. Hittell, we present the following extracts: Mineral springs are more abundant in California and Nevada than in any other equal area in the civilized world, and will probably at no distant time attract many visitors and be of much interest to pleasure seekers, invalids and the medical profession. They are especially numerous in the coast mountains and valleys for a distance of 100 miles northward from San Pablo bay (a branch of San Francisco bay), about Mount Lassen, and at the eastern base of the main ridge of the Sierra Nevada, near the Oregon line. These districts were the sites of great volcanic activity in a remote age, and the subterranean heat comes near to the surface now. At the Geysers large quantities of hot steam rise constantly from blow-holes; and at the Sulphur Bank, near Clear lake, the earth at a depth of a few feet is scalding hot. Many of the springs are warm, or hot, are strong with different mineral combinations, so that when they shall have been fully examined they may be found as valuable for the cure of disease as all the mineral waters of the Atlantic States and Europe together. As yet, scarcely a score have been analyzed.

For the purpose of presenting in a convenient shape such knowledge as is now obtainable about the California mineral springs that have been analyzed, I have prepared some tables, in which the waters are classified according to their predominant qualities, and placed alongside of European springs which have gained a reputation in the course of ages for their curative power.

The leading

Classes of Mineral Springs

Are the alkaline, with carbonates predominant; the saline, with chlorides; the chalybeate, with a good proportion of iron, and weak otherwise; the purgative, with sulphates; the sulphur, with an odor of sulphur, and without much strength in either carbonates, chlorides or sulphates; and the thermal, which are prized mainly for bathing purposes. Springs of all these classes, save the purgative, abound in California and Nevada, and probably after more have been examined, purgative springs will be found too.

The following is a table of the number of grains in a gallon of the water of alkaline springs. Wherever in that or the following tables, the quantity of any solid given is less than half a grain, the amount is indicated by an asterisk. The quantity of gas is given in cubic inches. The name of the chemist making the analysis is given, if known.

CONSTITUENTS.	Vichy (Rouge)	New Almaden	Ems (Fresenius)	Etna (Fresenius)	Alma (Fresenius)	Alma (Price)	Sanel (Bauer)	Congress
Carbonate of Soda.....	208	201	84	75	156	57	53	62
Carbonate of Magnesia.....	11	11	7	14	11	99	45	58
Carbonate of Lime.....	18	32	10	10	16	29	70	38
Carbonate of Iron.....	16	16	1	1	1	1	1	7
Carbonate of Potash.....	18	18	1	1	1	1	1	1
Sulphate of Soda.....	18	18	1	1	1	1	1	1
Sulphate of Magnesia.....	12	12	1	1	1	1	1	1
Sulphate of Lime.....	42	42	1	1	1	1	1	1
Sulphate of Potash.....	32	32	62	29	36	4	17	60
Chloride of Sodium.....	6	6	1	1	1	1	1	1
Chloride of Lime.....	3	3	1	1	1	1	1	1
Phosphate of Soda.....	311	432	170	137	223	159	186	168
Total Solids.....	117	112	54	53	264	804	804	804
Carbonic Acid.....	105	115	38	50	1	1	1	1
Temperature, F.....								

The carbonates of soda in the New Almaden, Etna and Sanel, the carbonate of magnesia in the Etna, and the carbonate of lime in the New Almaden, in the above table, are double, or bicarbonates. The Vichy water is, for a large class of diseases, considered the best in the world; that is, it is the best known as having been effective in a large number of cases. It is especially valuable in dyspepsia, disease of the liver, diabetes, gall stones, gout and paludal cachexia. Large quantities of it are sent, in barrels and bottles, to distant places, some of it coming to the shores of the North Pacific. The waters of Fachingen differ considerably from those of Vichy, yet are found effective in the same kinds of disease. The Ems water is useful in chronic bronchitis, granular pharyngitis (clergyman's sore throat), and catarrhs of the stomach, hepatic ducts, bladder and uterus. When drank in excess it causes constipation and inflammation of the stomach. It will be observed that the New Almaden spring, sixty miles south of San Francisco, has a close resemblance to the Vichy; and the Etna, in Pope valley, seventy miles north of San Francisco, to the Ems.

The New Almaden spring has attracted few visitors. The Adams, which for several years past has attracted more visitors than any other Californian spring that has been analyzed, is decidedly inferior to the New Almaden or the Etna. The last, at the eastern base of Mount St. Helena, in a little valley surrounded by mountains, with shade, game, beautiful walks, drives, and abundant water, 18 miles from a railroad station, is well fitted to be a favorite resort for poor as well as rich invalids. The Congress spring at Saratoga, 60 miles south of San Francisco, might be classed with the chalybeates, though I have preferred to put it with the alkaline. It has excellent qualities, but its fitness for daily use by persons in good health is doubtful, though much of it, after having

been artificially filled with carbonic acid gas, is sold for that purpose. As an alkaline chalybeate I do not know of its equal.

It will be observed that in some springs carbonates are reported, in others bicarbonates. Wherever there is free carbonic acid, most of its salts are bicarbonates, but some chemists reduce them to carbonates. Eighty-four grains of carbonate of soda contain as much soda as 100 of the bicarbonate, and the other 16 grains of carbonic acid equal to about 16 cubic inches, may be counted as part of the carbonic acid gas.

The following are the leading chalybeate and thermal springs of Europe and California:

Constituents.	Schwalbach (Fresenius)	Spa (Fresenius)	Napa Soda (Fresenius)	Geyser (Fresenius)	Lifton (Skaggs)	Gastin (Wolf)	Schlangenbad (Fresenius)	Calistoga
Carb. Soda.....	1	1	13	23	24	2	1	3
Carb. Magnesia.....	1	1	36	10	10	2	2	1
Carb. Lime.....	1	1	11	5	5	2	2	1
Carb. Iron.....	1	1	8	3	3	12	1	1
Sulphate of Soda.....	1	1	10	10	10	2	15	3
Sulphate of Potash.....	1	1	10	10	10	2	15	3
Chlo. Sodium.....	1	1	10	10	10	2	15	3
Chlo. Lime.....	1	1	10	10	10	2	15	3
Chlo. Magnesia.....	1	1	10	10	10	2	15	3
Total Solids.....	45	20	69	57	57	21	20	38
Carbonic Acid.....	45	52	52	52	52	52	52	52
Temperature.....	41-61	52	52	52	52	37-160	38-58	57

The carbonates of soda in the Napa, Geyser, and Skaggs, and the carbonate of magnesia in the Geyser and Skaggs springs are double or bicarbonates.

The best chalybeate springs of Europe are those of Schwalbach and Spa. The former, besides the component parts mentioned in the table, has traces of phosphate and borate of soda, and carbonate of magnesia, of which the last two are regarded as inert, and the former as of little effect. The chalybeate waters are prized as remedies for anemia, chlorosis, and all diseases curable by mild tonics. Cheltenham, called the best chalybeate of England, has three grains of carbonate of iron, and 129 of sulphates of magnesia and soda, and 330 of chloride of sodium, to the gallon, so that the purgative and saline qualities are far stronger than the chalybeate.

The Skaggs and Geyser springs have very good qualities, but I regard the Napa soda as the best chalybeate water known. It has more iron than any other springs the analysis of which I have seen. It has little inert material, and its active salts are good in their kind, amount and proportion. The quantity of carbonic acid gas is not reported, but it is abundant. The spring is covered by a copper vessel, into which the gas escapes, and from which it is pumped into a machine, which again forces it into the water before bottling. About 720,000 bottles of it (equal to 45,000 gallons) are sold annually in San Francisco, where it is consumed largely as a pleasant beverage, and a check upon the after effects of distilled and fermented liquors. The spring is situated about 35 miles north of San Francisco, and 1,000 feet above the sea, on the western slope of the mountain ridge east of Napa valley, commanding an extensive and charming view. The place has many advantages for the fashionable pleasure resort which it will in time become. It is not yet prepared for the general reception of visitors, though many go there. A chalybeate spring at the Geysers, 100 miles north of San Francisco (but which one of the hundred springs at the Geysers, the proprietor of the place does not know), has excellent chalybeate water, fully equal, I think, to either Schwalbach or Spa. The presence of a small quantity of sulphate of soda in the three chalybeate springs of California above given, is an advantage over their European rivals. There is suspicious similarity in the figures of the Skaggs and Geyser springs.

The most noted European thermal springs, that is, warm without any strong mineral character, are Gastin and Schlangenbad. The former has a reputation for curing paralysis, chronic rheumatism, and certain forms of weakness; the latter for skin diseases, rheumatism, gout, hysteria, and erythema of the nervous system. The Calistoga water bears a close resemblance to them, and is doubtless equally good for drinking, while for bathing, on account of its larger proportion of chlorides of sodium and lime, it should be better. It will be observed that Vichy, which is drank in large quantities, has twice as much chloride of lime as Calistoga. The temperature is also better than that at Schlangenbad, and has very nearly the best degree of warmth for a thermal spring.

The following are the

Leading Sulphur Springs:

Constituents.	Aix-la-Chapelle (Fresenius)	Aix-la-Chapelle (Fresenius)	Bagnères-de-Luchon (Fresenius)	Paso Robles No. 1 (Fresenius)	Paso Robles No. 2 (Fresenius)	White Sulphur No. 6 (Fresenius)	White Sulphur No. 7 (Fresenius)	White Sulphur No. 2 (Fresenius)
Carbonate of Soda.....	40	40	51	5	5	1	1	1
Magnesia.....	3	3	1	3	3	2	4	1
Lime.....	10	10	1	1	1	2	6	1
Iron.....	17	17	1	1	1	11	13	6
Sulphate of Soda.....	1	1	1	1	1	1	1	1
Magnesia.....	1	1	1	1	1	1	1	1
Lime.....	1	1	1	1	1	1	1	1
Potash.....	10	10	1	1	1	1	1	1
Alumina.....	1	1	1	1	1	1	1	1
Sulphate of Sodium.....	162	1	27	96	23	14	23	1
Chloride of Sodium.....	1	1	1	1	1	1	1	1
Lime.....	22	25	14	35	168	43	40	3
Total Solids.....	225	25	14	35	168	43	40	3
Carbonic Acid.....	3	3	18	84	1	1	1	1
Sulphureted Hydrogen.....	7	7	230	230	4	4	4	4
Temperature.....	131-108	131	100	123	86	69	89	89

The carbonates of soda and magnesia in Paso

Robles spring No. 1, are double or bicarbonates.

Aix-la-Chapelle is noted for the cure of chronic rheumatism and diseases of the skin; Aix-les-Bains for chronic rheumatism, diseases of the skin, syphilitic complaints and paralysis; and Bagnères-de-Luchon for scrofulous and syphilitic affections (for these latter the best in Europe), pustulous eczema, psoriasis, pityriasis, ichthyosis, rheumatism and old wounds. The last spring is very weak in its mineral character, and probably owes a large part of its efficiency to its high heat and its extensive use for bathing. Aix-la-Chapelle contains traces of iodide and bromide of soda, and Aix-les-Bains has traces of iodide of potash and sulphate of alumina. There are also traces of iodine and bromine in Paso Robles No. 2 (the mud spring), and they give that spring a superiority for diseases, and rheumatism resulting from them, over any other yet analyzed in California. The White Sulphur spring No. 2, has 6 cubic inches of sulphureted hydrogen in a gallon; No. 6 has 4 inches, and No. 7 a trace. These waters are good for skin diseases. It is probable that if the White Sulphur water were heated to 115° it would be fully equal to the Bagnères-de-Luchon; but there are numerous sulphur springs of similar composition in California, and hot enough by nature.

EUREKA MONTHLY BULLION. — During the month of March, Eureka district shipped abroad bullion valued at \$439,750. In the same period the Richmond company shipped fine bars valued at \$173,789.44, making our total treasure shipments for the month \$613,539.44. This sum does not represent the total yield of the district, as the Richmond furnaces turn out crude bullion much faster than the refinery is able to separate it, and there is now stacked up at the works nearly 3,000 tons of bullion awaiting that process. The gross yield is something over \$800,000, the output of eight furnaces. The shipments of refined lead and the lead contained in the crude bullion will aggregate 3,000 tons, which, estimated at its present value—\$75 per ton—would add \$225,000 to the above, and make a grand total of something over \$1,000,000, which latter amount may be set down as our regular monthly contribution to the wealth of the world. There was also received and forwarded during the month, through Wells, Fargo & Co., bullion to the amount of \$174,346.92, the same being a portion of the product of the several districts south of this point.—*Eureka Sentinel*.

DEEPEST VERTICAL SHAFT IN THE UNITED STATES.—The Combination shaft is down 2,060 feet, and is now the deepest vertical shaft in the United States. It is intended to sink it vertically to a depth of 3,000 feet, at which point it is expected to intersect the Comstock lode. This will make it as deep as the deepest vertical shaft in the world. When the shaft shall have attained a depth greater than the lowest levels of the Savage and Hale & Norcross, a drift will be run from it to draw off any water there may be in those mines. This connection may be of great value in many ways, particularly in ventilating the lower levels, thus allowing a new departure to be taken from them to still greater depths. As often as may be considered necessary, other drifts may be run from the shaft to the lode. As the lode is dipping toward the shaft the distance, it will be necessary to drift to make the connection will constantly be growing shorter.—*Territorial Enterprise*.

WOOD IN WASHOE.—There now remains at the wood yard, at Huffaker's station, about 5,000 cords of wood. The flume at that point will resume operations about the first of June. There are in the mountains about 75,000 cords of wood to be sent down this flume. The flume at Washoe City is to be abandoned, there not being enough wood at its head to justify keeping it up. The greater part of the wood supply this summer will come from above the Clear creek country, satisfactory terms having been made with Yerington & Bliss and other large wood owners in that direction by the bonanza people. It is said that there is in this part of the Sierras, wood that has been cut and corded up for the past five years. It should be good and dry by this time.—*Territorial Enterprise*.

DEATH OF A GIFTED MAN.—A note from a member of Lieut. Wheeler's surveying expedition, received yesterday, informs us of the death, in Washington, week before last, of Dr. F. Kampf, astronomer for Wheeler's expedition. He was kicked in the forehead by a mule in Ogden, Utah, last fall, and the injury finally resulted in his death. Dr. Kampf was in this city some weeks two years ago, and endeared himself to a multitude of people. He was one of the most genial of gentlemen, and was full of the eccentricities which often attend upon genius. He was probably the foremost mathematician in the United States; a wonderful scholar in many respects, and his death is as much a loss to science as it is a sorrow to the gifted man's wide circle of friends.—*Territorial Enterprise*.

A NEW TAX.—A law passed by the last Legislature requires the secretaries of all corporations to collect 10 cents on each certificate of stock issued, whether as original or transfer shares. It is estimated that the tax will amount to \$50,000 or \$60,000, all of which goes into the General Fund of the city. Secretaries failing to make proper returns to the Tax Collector will be liable to punishment for misdemeanor.

More Economy Required in Mining.

The immense quantities of smelting ores found in Montana—ores that cannot be reduced by mill process with a profit, if at all—makes the subject of smelting one of great importance to many in the Territory. Numerous furnaces have been erected at considerable cost and all have been run with more or less success, but to our knowledge only one—the Hecla company's at Glendale—has been kept continuously running. There have doubtless been many causes that have conspired to make these enterprises almost total failures. In one case it was bad management; in another, lack of capital; a third, lack of suitable ores in proximity to the smelter; and another, that no clay could be found for lining the furnaces that would stand the immense heat to which it was subjected. These are but a few of the many causes that have been assigned for failure. But in our opinion there are other causes that have had an equal or greater bearing upon the subject than those enumerated. They are defective furnaces and a lack of the requisite knowledge of the proper treatment of the ores. The smelting of ores has been very successfully carried on in Utah and Nevada, but even with the vast amount of experience that has given those operators their present success, it must be confessed that they have much to learn, as the ores that are most successfully manipulated do not yield a very large percentage of their assay value. The amount lost in the slag is simply enormous. But even free smelting ores constitute but a tithe of the ores in those regions where smelting is now so successful. What is wanted is the discovery of some process whereby the free ores can be worked closely and the rebellious ores treated with success. Many are the experiments that have been made to solve these problems, and much money has been uselessly spent in the effort, but so far without marked success. The Nevada papers of a recent date speak very encouragingly of a new process that has been tried on a small scale at Reno. They claim that the Schively brothers have been experimenting upon the most rebellious ores that could be found—ores that have resisted all efforts at successful reduction during the past 10 years—and that they have succeeded so perfectly that not a trace of the precious metals can be found in the slag. If further tests are as successful it will be the dawn of a new mining era in that State, as the quantity of rebellious ores there is almost limitless.—*Montana Independent*.

PIG LEAD FROM FUMES.—The Joplin (Mo.) *Mining News* explains its recent statement that pig lead is being made from smoke as follows: In the process of smelting the ore a great deal of it escapes in the form of smoke, or lead fumes, as it is more properly termed. It has been known for years that a large per cent. of the metal was thus lost by its being sublimized and passing off into space. The white lead company was formed for the purpose of catching this smoke and by passing it through an almost endless line of pipes of sheet iron and woolen bags, condense it. The result was that after an outlay of many thousand dollars and a year's experimenting they have succeeded in condensing the smoke, or lead fumes, into metallic lead, the same as steam is converted into water. The product of the fumes is a bluish, impalpable powder, which makes a splendid blue paint, pronounced equal to the corroded article. For the purpose of making it white several furnaces were built, and the blue product, with the aid of an immense heat, is again changed into lead fumes, which is again condensed and comes out pure white lead. In the transforming of the blue lead into fumes, considerable pig lead is made. The object is to sublimize it all, but the heat is not powerful enough to do so.

PROGRESS OF ARIZONA.—The onward progress of Arizona to increased population, wealth and internal development, meets with no untoward interference. The Southern Pacific railroad begins to feel the impetus of the hot breath of prosperity from across the Colorado. The result of this year's business will show a marked improvement over that of the previous one, with excellent prospect of steady continuance in well doing. The population of Arizona presents a rapid and most satisfying increase. The *Arizona Enterprise*, in a short editorial, says: "We do not go beyond proper bounds when we say that the population of Yavapai, Yuma, Mohave, Pinal and Maricopa counties is now double what it was two years ago, and that in less than six months Yavapai will have a population of 25,000 souls. The population of Pima is also on the increase. A gentleman from the East, via the 35th parallel route, says he passed more than 500 people coming this way. A great many people are also en route from California, Oregon, Nevada, Utah, Washington and other States and Territories, with the intention of settling in middle and northern Arizona."

RAILWAYS IN PORTUGAL.—Of all governments in Europe, Portugal is paramountly developing her railroad system to a very great extent, so as to improve and extend the various resources of that small but very fertile and promising country—which under her present minister of public works, Sr. Lourenco de Carvalho, is making very rapid progress—so as to bring the agricultural, the vinicultural and mineral wealth of the nation into a prosperous and profitable development.

Northwestern Arizona.

Touching this region of country, its towns and mines, a correspondent of the Prescott *Enterprise* writes as follows:

Between Mineral Park and Signal is a splendid stock country, yet not to exceed 10,000 head of cattle eat the nutritious grasses so abundant, and which would keep fat and frisky many thousand head.

About 30 miles north of Signal, on Sandy creek, the traveler commences to pass well cultivated ranches. The soil along this creek is rich, there is plenty of water for irrigation, and the climate is so mild that almost everything that is cultivated in California would do well here.

Signal does not at first strike one favorably, but the town is but a few mouths old and lumber for building is scarce. The population is about 1,000, with but a small proportion of women and children.

There are three mills here—40 stamps in all: The McCrackin 20-stamp mill, McCrackin 10-stamp mill (three miles above town), and the Signal mill of 10 stamps.

The McCrackin is the principal ledge in the district (Owen), though there are a number of large and well defined ledges which, when opened up, may prove to be equally valuable.

The deepest shaft on the McCrackin mine is about 450 feet, but, strange to say, the width of the ledge has never yet been determined. It is believed to be about 80 feet. Breasts of ore 40 feet in width have been taken to the mill and worked without sorting, yielding \$75 per ton. None of the ore taken out is sorted, and the 20-stamp mill crushes in the neighborhood of 100 tons per day. It is free milling ore, similar to that of the Comstock, very easily crushed and the average yield is about \$75 per ton.

The Signal mine is on the same ledge, the ore of like character and of equal value; but the body of ore is not so great as on the McCrackin. The Signal mill gets away with about 45 tons per day.

The McCrackin 10-stamp mill is now running on tailings, but when it is turned loose on ore fresh from the mine will pound the silver out of about 40 tons every day. So the bullion yield of this district will this year amount to several millions of dollars.

The mills are 12 and 15 miles from the mines, and I believe the ore is delivered for about \$5 per ton. Lots of water for milling purposes; wood \$5 per cord.

RECKLESSNESS OF COLLIERIES.—This is proverbial, and is fully sustained in the following items of recent date: "T. Christopher went to work at the Heskin Hall colliery with his son. When they reached the place where they should have begun work, they found the rails pulled up, as a signal of danger; but nevertheless, the miner went forward with a lighted candle to fetch his tools out of the working, and directly he reached it, there was an explosion of gas and he was so badly burned about the body that he died." "Two colliers were brought to court; it appears that they took down into the pit a quantity of loose powder in a bag, and in the most reckless manner placed it close by the side of a lighted candle. Shortly afterwards part of the lighted 'snuff' of the candle fell on the bag containing the powder, but very fortunately the spark was discovered and extinguished just in time to prevent an explosion. Both of the defendants pleaded guilty, and were fined £2 each and costs, or one month's imprisonment with hard labor. At the same court three colliers, were charged with having rendered useless a ventilating door in a mine by propping it open. They were fined 10s. and costs or 14 days imprisonment."

THE HACKBERRY MINE.—Latest advices from this property, situated in Mohave county, Arizona, are highly encouraging. The main shaft is now down nearly 450 feet. Various other shafts of lesser depth open up the mine for a length of 600 feet. All the shafts and levels are showing increased bodies of high-grade ore. The new mill is nearly completed and will soon be pounding out the bullion. There are 1,000 tons of ore now on the dumps, which, it is expected, will mill some \$200 per ton, and 4,000 tons in eight of equally good ore. A new set of hoisting works are also in process of erection at the mine, with a capacity to sink 1,500 feet. —*Yuma Sentinel*.

TERRA COTTA AND FIRE BRICK.—The Antioch *Ledger* says: I. Nicholson, proprietor of the Albion Pottery, shipped \$1,000 worth of stoveware to San Francisco, on Wednesday. Our hills contain unlimited quantities of valuable clays, which, with present facilities for shipment and cheap fuel, will lead to extensive manufacture of pottery ware and terra cotta work, as the State increases in population and the demand increases.

THE PARADISE VALLEY MINES.—Experts, who have visited these mines, express themselves to the *Silver State* as being favorably impressed with the prospects. They say the ledge crop out bold and strong, and while there is not sufficient work done to enable even experts to form a decisive opinion, they have not much doubt of their richness and permanency.

THE OLD RUBY MOUNTAIN MINES.—The *Eureka Republican* has good reports from these mines, in White Pine county. The Blackfoot and Crown Point ledges show especially good indications.

USEFUL INFORMATION.

TO PREVENT HONEYCOMB IN CASTINGS.—Mr. John Bourne, C. E., of Mark Lane, London, has patented a device to prevent honeycombing in castings, by which he extracts from the metal, while in the molten state, the gas or gases by which the honeycombing is produced. The removal of the gases may be effected by the aid of any mechanical means capable of producing rarefaction, such as a common pump, an exhausting jet of steam or other fluid, the hydrostatic gravitation of a column of the molten metal itself, or any other exhausting expedient, by which a vacuum more or less perfect is produced. The molten metal must be exposed to the action of the vacuum in such a manner as to insure the disengagement of the gas from the metal, and for this purpose he submits the metal to the vacuum preferably in a state of minute subdivision. This may be accomplished by allowing the molten metal to run through perforations in a fire-clay block into a tall cylinder, within which a vacuum is maintained. By thus subdividing the metal, and discharging it in the form of a metallic rain into an exhaust chamber, the gases are separated from the metal, and are sucked away by the pump or other extractor in communication with the exhaust chamber. He remarks that it is not intended to subdivide the molten metal (without the aid of a vacuum), for the removal of the gases, nor to attempt to suck away the gases from a vessel filled with molten metal by producing a vacuum above the metal, as the hydrostatic pressure of the metal itself would, under such circumstances, retain the gases within the metal, notwithstanding the existence of the vacuum above it; but he extracts the gases by the conjoint action of the vacuum and of the subdivision, as above explained, or by analogous or equivalent means embodying the same conditions.

BILLIONS AND TRILLIONS.—The ocean (says the "Cyclopædia Britannica") contains 290,000,000 cubic miles of water. Each cubic mile contains 5,431,776,000 cubic yards. Therefore, in round numbers, the ocean contains 5,400,000 billion, or 1,620,000 billion cubic yards. Therefore, 1,620,000 cubic yards is one-billionth part of the ocean. Now 162,000x10 yards represents a pond 30 feet deep and about 33 acres in superficial area, or to put it in another way, a pond 1,620 yards long and 100 yards wide. Roughly, if the Serpentine were 30 feet deep, it would be about a billionth part of the ocean. The "Cyclopædia Britannica" also tells me that a millimeter cube contains 5,000,000 blood corpuscles. If so, a square meter of the thickness of one millimeter must contain 5,000,000x1,000,000, or 5,000,000,000 blood corpuscles; and a cubic meter would contain 5,000 billions of them. Neglecting the difference between meters and yards, the ocean would contain 1,620,000 billionx5,000 billion or 8,100,000,000 billion, or eight thousand one hundred million trillions of blood corpuscles. How much blood there is in an average man I do not know, but certainly much more than would cover a square meter to the depth of a millimeter, so there must be in each of our veins a good many billions of blood corpuscles.

URANUS.—The planet Uranus is now very favorably situated for observation, though, except with a powerful telescope, there is very little to observe. It is at present easily detected by the naked eye on a dark night, being the eastern of two faint stars, which lie about 1½° northeast of the bright star Regulus. To the telescope it presents a pale bluish disc, about one-fourth as large as that of Saturn, without markings or spots of any kind. Telescopes less than eight inches in diameter would have no chance to show any of its satellites. With instruments of nine to 10 inches aperture, a fairly good eye can, under favorable circumstances, see the two outer ones, Oberon and Titania, though, to make measurements of their position, would require a still larger aperture. The two inner satellites, Ariel and Umbriel, are beyond the reach of all but the most powerful telescopes. Even with the great Washington Equatorial they cannot always be seen.

DEPOSITS OF NITRATE OF SODA.—The government of Chile have just issued documents setting forth the recent discovery of large deposits of nitrate of soda and of guano in the vast desert of Atacama, which lies between the 23d and the 27th parallels of latitude, and extends along from the coast line to the base of the Andes. The nitrate of soda is described as of great richness, and the deposits of guano will bear comparison with those of Peru both in their quality and quantity. At present these sources of wealth can be turned to little practical account, owing to the want of means of communication, but the government have determined to set about the construction of roads and the preparation of a port upon the coast, and have already directed the establishment of settlements in different parts of the desert.

POURING LEAD.—Many mechanics have been sorely tried when pouring lead around a damp or wet joint, to find it explode, blow out, or scatter from the effects of steam generated by the heat of the lead. The whole trouble may be stopped by putting a piece of resin, the size of the end of a man's thumb, into the ladle and allowing it to melt before pouring.

BRITAIN'S IMPORTATION OF FOOD.—A late issue of the London *Times* contains an interesting compilation of statistics, showing the aggregate sum expended by England for food from abroad, from which we glean that the amount paid in the year 1877 to foreign nations for corn, cattle and meat was \$484,308,685, to contrast with \$435,646,930 in 1876. For live stock the sum disbursed was, in 1877, \$30,078,450 as against \$36,301,515 in the preceding year—the prices paid being somewhat lower last year than the year before. The sums for fresh meats were much larger, consequent upon the shipment from the United States and Canada of quantities of beef and carcases of mutton. The total sum paid for foreign stock alive and dressed was, in 1877, \$86,568,370; in 1876, it amounted \$96,152,275. For corn, the sum paid last year was \$315,961,120; in 1876, \$257,673,240. Foreign butter cost in 1877, \$47,691,525; cheese, \$23,840,266; and eggs, \$12,362,406, to be compared, respectively, with \$48,513,120, \$21,257,140, and \$13,051,655 in 1876. The British demand for American butter and cheese is constantly increasing.

GERANIUMS AND SNAKES.—We lately read an account of a mining locality in Calaveras county being infested with snakes. In this connection we may observe that the report is that every species of snake may be permanently driven away from an infested place by planting geraniums. In South Africa the Caffir people thus rid their premises of snakes. A missionary of South Africa had his parsonage surrounded by a narrow belt of geraniums, which effectually protected the residence from any kind of snake. A few yards away from this geranium belt a snake would occasionally be found. It is well known that the whole geranium genus is highly redolent of volatile oils—lemon scented, musk scented, and peppermint scented. What, therefore, is a very pleasant nose-gay for man is repugnant to the serpent tribe.

ICE.—Ice did not become an article of commerce until the present century; but already in the United States alone \$30,000,000 are invested in the business of gathering and selling it. There has been a remarkable increase in the use of the article in the United States since 1845, when only 50,000 tons of it were used. In the year 1876 the consumers bought 2,500,000 tons, and probably 5,000,000 tons were cut. Beer brewers are the best customers of the ice companies, several using 30,000 tons of ice annually.

TO RESTORE MAHOGANY POLISH.—One gill of raw linseed oil, one pennyworth of butter of antimony, and one tablespoonful of vinegar; put in a bottle and shake before using.

GOOD HEALTH.

Wearing the Beard.

Hair is nature's protector against cold. Our beneficent Creator does nothing in vain. Rowland says on this subject: "It may be safely argued as a general physiological principle that whatever evinces a free and natural development of any part of the body, is, by necessity, beautiful. Deprive the lion of his mane, the cock of its comb, the peacock of the emerald plumage of its tail, the ram and deer of their horns, and they not only become displeasing to the eye, but lose much of their power and vigor. And it is easy to apply this reasoning to the hairy ornaments of a man's face. The caprice of fashion alone forces the Englishman to shave off those appendages which give to the male countenance that true masculine character, indicative of energy, bold daring and decision. The presence or absence of the beard, as an addition to the face, is the most marked and distinctive peculiarity between the countenances of the two sexes. Who can hesitate to admire the noble countenance of the Osmanli Turk of Constantinople, with his un-Mongolian length of beard? Ask any of the fair sex whether they will not approve and admire the noble countenance of Mehmet Ali, Major Herbert Edwards, the hero of the Punjab, Sir Charles Napier, and others, as set off by their beard? We may ask with 'Beatrice,' 'What manner of man is he? Is his head worth a hat, or his chin worth a beard?' I have noticed the whiskers and beards of many of our most prominent physicians and merchants encroaching upon their former narrow boundaries, while it is well known that not a few of our divines have been long convinced of the folly of disobeying one of nature's fixed laws; but hitherto their unwillingness to shock the prejudice of their congregations, has prevented them from giving effect to their convictions. The beard is not merely for ornament, it is for use. Nature never does anything in vain; she is economical, and wastes nothing. She would never erect a bulwark were her domain unworthy of protection, or were there no enemy to invade it."

HOW POISONS ARE SPREAD.—Mr. G. Owen Rees, Consulting Physician to Guy's Hospital, London, has called public attention to some unexpected sources of arsenical poisoning. The green calico lining of bed-curtains has been found to have produced, for months, severe symptoms, which were treated as those of natural disease, without benefit to the patient. When the curtains were removed the patients at once recovered their health.

Drain and Ventilate.

We refer to these subjects very often in this column, and fitly, because they are the corner stones in the preservation of health. The *Polytechnic Review* thus presents the subject: "Wherever the soil water, unpurified by contact with unclean organic matters, sinks into the earth, it leaves behind it a moist and unwholesome residuum, and the warmer the air, the water and the soil, the more energetic are its unwholesome influences. Whether the infectious matters are transferred from the soil into the well waters, or whether they enter the air directly with their gaseous products of decomposition or by evaporation, are merely incidental accidents which do not at all affect the result, since, in every case, it is those who dwell upon or near such unwholesome soils who are the greatest sufferers. If the air of our dwelling houses is not frequently renewed by ventilation, or if water charged with organic impurities is permitted to saturate the soil about them, or if decomposing organic matter (or what is the same thing, filth) is stored up in the neighborhood, or so disposed of that it is permitted to impregnate and saturate the soil about and beneath the house, or if the channels by which these offensive matters are removed from the house, as in the sewerage systems of cities and towns, are not properly constructed or guarded, the air that enters a dwelling thus environed, will be charged with disease-breeding emanations arising from the soil or from the sewer pipes. The drinking water may become impregnated, and the unwholesome products thus introduced into the bodies of its inhabitants will, beyond all question, exert the most pernicious effects upon health, producing, according to the quantity of exposure and individual peculiarities, consequences more or less fatal."

CANDY AND TEETH.—*Hall's Journal* comes to the rescue of our candy-loving little ones, and says it is not true that sugar and candies are of themselves injurious to the teeth or the health of those who use them; so far from it, they are less injurious than any of the ordinary forms of food when employed in moderation. It would be a strange contradiction in the nature of things, if sugar and candy in moderation should be hurtful to the human body in any way, for sugar is a constituent of every article of food we can name. There is not a vegetable out of which it cannot be made, not a ripe fruit in our orchards which does not yield it in large proportions, and it is the main constituent of that "milk" which is provided for the young of animals and men all over the world. But to use this information intelligently and profitably, it must be remembered that sugar is an artificial product, is a concentration, and that if used in much larger proportions than would be found in our ordinary food, as provided by the beneficent Father of us all, we will suffer injury. We should never forget that the immoderate use of anything is destructive to human health and life, if persevered in. The best general rules to be observed are two: First, use concentrated sweets at meal times only; secondly, use them occasionally and in moderation.

POISON IN ARTIFICIAL FLOWERS.—Danger from picric acid lurks not only in colored stockings. The material is used for coloring in the manufacture of artificial flowers, and a well-defined case of poisoning therefrom is reported from New York. Mary Dougherty, aged 13, who had been employed a few months in a flower manufactory, has just died. Her death is attributed to poison which is supposed to have been communicated to the girl's system by the material with which she worked. The case needs to be carefully investigated to the end, that the exact character and effects of picric acid may be made known. Men who dye the cloth, which Mary Dougherty and other girls have made into flowers, receive no harm from working bare handed in the liquid. It is alleged sickness among the workers in the colored goods is the exception. Some organizations must be more susceptible to the influences of picric than others, or Mary Dougherty's death must be traceable to other causes. It is to be hoped the case will be carefully examined.

REMARKABLE SURGERY.—Robert F. Hurlbut, private secretary of Governor Bishop, of Ohio, has just had his tongue amputated near the root. The chin was sawed in twain and the jaw spread apart in order to take out the diseased tongue. The work was done in a comparatively short space of time, and the patient was comfortable and conscious in less than an hour. Next day Mr. Hurlbut walked across the room, and wrote his wants upon paper. He is not permitted to attempt to speak, and, of course, could not do so if he desired. The physicians think he will be able to articulate audibly in the course of time. Thus far the difficulty has been to give nourishment, which has been done by injection. Glass tubes have been secured, and hereafter nourishment will be given by that means until the soreness in the month is somewhat subdued. Mr. Hurlbut had a cancer at the root of his tongue. A like operation for the same cause was recently performed at one of the hospitals in Albany, but the patient died a few days subsequently.

COUNTRY AIR.—"People may say what they like about country air being so good for them," said Mrs. Partington, "and how they get fat upon it; for my part I shall always think it's owing to the vittles. Air may do for canamiles and other reptiles that live on it, but I know that men must have something more substantial."

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SAN FRANCISCO:

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The Week.

Slowly California is recovering from the industrial depression growing out of last year's bad harvest and other untoward events, and it will not be long till our material interests are restored to a normal condition, the country improved by the observance of more frugal habits, and the practice of greater industry, which the prevailing hard times have made necessary. With this partial revival of business and the return of good weather, there is more work for the unemployed, the number of whom, when the grain harvest sets in, will be still further reduced. Although we have had a large idle population for the past six or eight months, the army of tramps has not visibly increased, never having assumed here the dangerous proportions reached in most other countries. With this good prospect for getting work at home, no great number of our laboring men have this spring left the State, neither the Black Hills nor Arizona having drawn very heavily on this element of our population. The settlement of threatened complications with Mexico has had a good effect upon our trade with that country, which, already considerable, may be expected to grow still more rapidly, should the pacific relations now existing between the two countries continue undisturbed.

Our Minerals at the Paris Exposition.

Almarin B. Paul, Chairman of the Committee on Minerals for the Paris exposition, has presented a report on the proceedings taken by that body, of which the following embraces the leading points. This committee commenced their labors after having been requested to do so by the leading citizens, business and mining men of the coast, represented by a general committee, chosen to act for these parties. Mr. Paul and his coadjutors, depending upon these wealthy and influential parties for assistance and support, proceeded to make all preliminary arrangements for insuring a full and creditable representation of our mineral wealth and mining industries at the great exposition, as the world had a right to expect, hiring rooms, issuing circulars and adopting such other measures as were required, expending money and incurring pecuniary obligations on their individual account to the amount of some \$800. On applying to the general committee for money to liquidate this indebtedness, they were found to be without funds, these influential and wealthy people having failed when called upon for aid to respond in a manner corresponding with their implied promises.

Next an appeal was made to the Legislature, then in session, and a confident belief that they would make a sufficient appropriation to enable the Committee to go on with the work they had undertaken, but this body, pleading the necessity for practicing public economy, declined to extend to them any assistance in their emergency.

In this crisis, and while the committee were about to announce to the public the failure of their efforts, John W. Mackey came to the rescue, donating the sum of \$5,500 for carrying on the work, which was thereupon continued, the enterprising gentlemen having it in hand applying themselves to its prosecution with renewed energy and zeal. After a period of four months their home duties have been brought to an end, the final shipment of specimens for Paris having recently been made.

During this time the labors of the committee, especially of the two more active members, Messrs. Paul and Hanks, have been unintermitting and arduous. That they have been ably and faithfully discharged will be generally conceded. Among other duties that they have had to perform, has been the writing of a large number of letters addressed to particular parties throughout every section of the coast; the preparation of circulars and catalogues, the classifying, labeling, boxing and shipping of mineral specimens, some of them of great delicacy or value, all requiring to be done with system and care. Altogether 69 boxes of this material have been sent off, the collection consisting of ores and fossils, minerals from California, Nevada, Oregon, Utah and Arizona, 15 of the boxes being filled with ores from various mines on the Comstock range. In view of the small amount of money available for the purpose, the collection may be considered both large and varied, no important mineral on the coast failing of a representation in it. The catalogue contains 1,387 leading specimens, some of which number as many as 40 varieties. The classification, attended to by Mr. Hanks, is perfect itself, and there is good reason for believing that the manner in which they will be displayed will be equally faultless, this gentleman having had much experience in the arranging of mineral cabinets. For the proper presentation of the smaller samples 50 cases covered with jeweler's glass, containing in all 300 running feet, are to be provided, the larger specimens being placed on stands.

After having served the end proposed, these specimens, unless reclaimed by the donors, will, on their return to this city, be here used to form the nucleus of a free museum of economic geology.

The Committee desire, through the press, to return thanks to Wells, Fargo & Co. and to the Central Pacific Railroad Company for facilities afforded in the transportation of articles; also to Edward Bosqui and W. T. Coleman for favors rendered both here and in New York; to Mr. Mackey the entire coast can only join in one hearty and simultaneous expression of thanks for his liberal and timely donation. That the members of this Committee should feel a little hurt at the manner in which they were left in lurch, after having been encouraged to go on with this business, is only natural. But it must be considered that the times are hard, compelling our citizens to many sacrifices in the interests of charity and the public good. The compulsory burdens of this community have been too heavy of late for them to assume voluntary ones with the same freedom as formerly. Again, it is not to be denied there are those who think the resources of California have been sufficiently advertised, if, indeed, we have not overdone that business, and do not therefore feel like contributing to bring them into further notice abroad. Hence this unexpected apathy in a cause that was thought to appeal so strongly to our local pride, that our leading citizens would emulate each other in extending to it a hearty support.

We are promised regular Eastern correspondence on practical subjects by Dr. Robert Grimshaw, well-known through his connection with the Franklin Institute, and his editorial management of an excellent cotemporary, the *Polytechnic Review*.

Varied Forms of Mining in California.

In some parts of the California gold fields the mines seem to expand under working. When one form of deposit has been worked out another presents itself. It is not easy to tell when the auriferous stock in certain localities is wholly exhausted. After the surface diggings have been depleted, lower strata of pay gravel are struck, situated sometimes under what was at first mistaken for the bedrock, or deep lying channels are opened up in places where none was looked for, or where there was little on top to indicate their presence. Abandoned districts that had yielded rich crops of gold dust to the first harvesters, on being gone over again, have blessed the gleaners more than they did the reapers. When the river bars and the beds of the gulches had been washed out the early miner considered his work final. But his successors found that the gravel run through his sluices would bear working over, and in some cases more than once. Then the river beds were laid bare and rifled of their contents. The subterranean channels were invaded, opening along their courses a new world to mining enterprise. The auriferous gravel banks were attacked, enlarging still further the domain of this industry; and now the modern river beds, that could not well be laid bare by wing-damming or fluming, are to be dredged or under-drifted and forced to contribute to the great want of the age, while the contents of such portions of the ancient channels as cannot be drained are to be lifted from their cradles by the hydraulic elevator, and made to yield up the gold that had been hid away in their dark chambers ever since the Pliocene epoch.

In the auriferous tailings that have made lodgment along certain of our mountain streams another new and attractive field for mining operations presents itself, the re-washing of this material, where practicable, being sure to prove exceedingly profitable. This branch of the business, while so very remunerative, is, so to speak, self-perpetuating, the hydraulic mines, primarily the chief source of supply, being likely to continue their contributions for a period reaching into the indefinite future.

While vein mining, keeping pace with placer operations, has made steady progress, it fills as yet only to an inappreciable extent the immeasurable field that opens for it here in California; and, although it does not take on such novel and varied forms as does the other branches of the business, it is still marked by certain noteworthy phases, being now after a quarter of a century most flourishing in the localities where it has been longest pursued, valuable quartz lodes being every day found in the most frequented as well as the most out-of-the-way places. Ore mining with us is only in its early dawn. What has been done amounts to hardly more than a series of experiments. When through these it shall have been a little more perfected it will stand almost first among our wealth-producing industries.

We allude to these various styles of mining, all of which are now being successfully practiced in California, to illustrate what a broad field is here opened for the pursuit of this business, nothing so diversified in the way of gold mining, being presented in any other country. Of the auriferous bluffs and heaches found along our northwestern seahoard we refrain from saying anything in this connection, inasmuch as the working of these have not as a general thing proved remunerative. In a few instances the washing of the gold containing sand found at these places has paid well, and many who have given the matter close attention are sanguine that the business will ultimately prove a great success. However this may turn out, certain it is these may justly be classed among the most remarkable of our many strange gold-bearing deposits, not a few of which hold out the most tempting inducements for the investment of capital while presenting at the same time inviting theaters for labor.

UNION IRON WORKS.—All readers who have need for iron work of almost any description, will be interested in the advertisement of the Union Iron Works, which appears in another column. This establishment is generally known as one of the most extensive and stalwart enterprises of our city, and the work which it has turned out, has served as a most important factor in our progress in mining and manufacturing. As may be seen by their advertisement, their range of work is wide. They give employment to a great number of men, and their establishment is worthy of patronage.

We are making arrangements to have our papers represented and pushed vigorously East of the Rocky mountains, by a journalist and engineer of ability and experience, who will devote himself to the acquisition of information of interest to our readers, and will also see that our advertisers' interests are advanced by a rapid enlargement of our Eastern circulation. Until further notice our New York address will be, P. O. box 1,947.

OUT ON THE DESERT.—A rich strike has been made on the 300 level of the Jones and Kinkead mine, at Pyramid. Assays from the new body run as high as \$218. The body of water is still so large at the bottom of the shaft that work has been temporarily suspended on the 400 level. —*Reno Journal*.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

GOVERNOR.—James Rigby, Carson, Nev. This invention relates to an improvement in steam engine governors and a novel method of employing the same, by which the speed of all classes of steam engines may be regulated, particularly those which are subjected to severe and sudden changes in the resistance to the power they supply. The invention consists in a novel construction for a main governor valve, and in combination with it of an operating engine, the valve of which is controlled and the admission of steam regulated by a revolving ball governor. This governor is mounted upon a spindle, having a pulley upon its outer end, which is driven by the frictional contact of another pulley; and this latter pulley is so mounted that the breakage of a belt allows it to immediately swing out of contact with the first pulley. A spring upon the governor spindle then acts to draw it back and with it the valve stem and valve, so as to shut off steam from the cylinder, and this allows the main steam valve to be closed so as to stop the engine or reduce its speed.

SOFA BED.—August Hansen, S. F. Mr. Hansen's improvements refer to that class of beds known as sofa beds. The invention consists in a novel construction of a hinged seat and back which unfold in opposite directions from the main portion of the sofa, so as to form a bed, having its length transversely to the direction of the seat. The back is peculiarly constructed, so that when folded up to form a sofa it maintains itself in position, and forms a strong brace. The arms, or end of the sofa, are fitted with reversible pieces to receive the upholstery, and these may be turned over, so as to prevent the upholstery from touching the floor when opened. One of the arms is provided with an extensible net to form a pillow at the side, if it be preferred to make up the bed in this manner instead of transversely.

WHEELS FOR VEHICLES.—Thos. H. King, S. F. This invention consists in a novel construction of the hub, with certain hearings, flanges and anti-frictional devices, whereby the inventor is enabled to reduce or entirely eliminate the tendency to break the axle, which results from the side strains upon the wheel. It also consists in a novel method of securing the spokes, so that a wooden spoke may be received in a perfectly solid manner within a metallic hub. A novel means is provided of completely closing and protecting the interior of the wheel against dirt.

CORNICE MOLD AND MITERING DEVICE.—G. K. Glenn and Henry Fern, Woodland, Yolo county. This relates to a novel construction of a cornice mold for the formation of plaster of Paris cornices in apartments, and so that the miter joints at the corners may be easily and rapidly formed at one operation, either externally or internally. By this method the joints are perfectly made at either side without further difficulty.

WATCH CASE SPRING.—P. F. Nelson, Santa Rosa. The invention relates to a novel construction of springs, which are intended to open the case of watches. It consists in the formation of the hinge and a hollow pin, so that a torsional spring may be introduced into the hinge, and serve to actuate the case without any outside connection.

The Special Commissioner to Paris.

Mr. Henry G. Hanks who has identified, classified and prepared the specimens of ores and minerals from this coast for the Paris exposition, left for Paris last Sunday. Mr. Hanks will, on his arrival there, arrange and take charge of the mineral exhibit, and will, without doubt, be able to make a very creditable display.

No better selection could have been made of a person to take charge of these minerals than Mr. Hanks. He has lived many years on this coast, is familiar with the various geological characteristics of different sections, and is thoroughly conversant with the state of our mining interests. He is, moreover, an enthusiastic mineralogist and collector, and a first-class chemist, having for many years followed the business of assayer and analyst. Mr. Hanks, in connection with Mr. Melville Atwood, was among the first on this coast to recognize the importance of the use of the microscope in the determination of mineral structure, and has followed that science closely for several years. He is probably the best judge of ores and minerals on this coast; that is, such is his familiarity with the subject that he seldom fails in judging at sight of the character of an ore or mineral of any description.

Such a man is eminently fit for the position assigned to him in this instance, and we have no doubt but that the whole coast will reap a material benefit from the appointment. People from all parts of the world will visit the exposition, and Mr. Hanks will be able to explain to them in an intelligent manner the peculiar characteristics, occurrence, etc., of all the specimens he has in charge.

The Art of Mechanical Design.

(Written for the Press—No. 1.)

Constructing a Steam Engine Cylinder.

The inventive genius of the American mechanic is proverbial. With every facility for practical observation and study, to see the operation of any mechanism, to work in the construction of machinery, it becomes a second nature to him, to endeavor by every means within his power, to simplify this arrangement, improve on that; resulting in the mechanical industries of the day constituting one continued progressive march.

While comparative seclusion must always command the best results in perfecting original modes of operation and combinations of mechanism, the practical mechanic in active daily occupation must always stand first in the ranks of those possessing the best chances of reaping a profitable and substantial return for the application of inventive genius, for the simple reason that his ideas are founded on realities, of practical use, and daily need, and his abilities are less likely to be led astray by impractical fancy, always regarding the demand for simplicity and general use.

While a natural gift of observation and comparison are common to all, so also is thought or originality of ideas; the first step being to record these ideas as they come, so as to make them available for further consideration by ourselves and others. Hence the desire, use, and necessity to reproduce, improve, and perfect them on paper by the art of mechanical design.

Though there are not wanting professors to teach this, having seldom worked through the shops themselves, in nine cases out of ten they weary and disappoint the machinist and pattern maker, by rules, theories, and abstruse propositions it may take months or years to master, and this from lack of acquaintance with the raw material, the vise, the lathe, wood, iron, hammer, chisel or file.

Leaving aside the professor's fee, let us calculate the expense of taking a lesson.

A drawing board and T square, a set square, four pins, two or three sheets of rough paper, a two-foot rule, pair of compasses and pencil, a complete and thoroughly efficient outfit for a sum too small to mention or within reach of all.

Perhaps the simplest object to start with in this first lesson is the cylinder of a steam engine. It forms the principal point of consideration in building an engine, the proportions of all the other working parts are designed from its proportions, and follow in due order and regularity, so much so that the cylinder is often referred to and spoken of as the whole engine. Having firmly fixed the paper on the board by a pin at each corner, place the square lengthwise across the paper, its edge level with the side of the board, about the center of the sheet, draw a line and write on the same center of engine.

Draw another line at right-angles to this at the center of the sheet, on this write center of stroke. Our work is now all set out and arranged, and on these two center lines we build and construct an engine any size to suit.

1st. The diameter, say one foot six inches, but first for convenience we will draw it on a scale of one inch to the foot, marking off three-fourths of an inch; on each side of the center of engine we draw two lines parallel to it, we have the top and bottom of the inside of the cylinder. By drawing two more lines, with a small space between, to represent the thickness of the metal, say five-eighths of an inch, we have the outside of the cylinder. Marking off one-twelfth inch each side of the center of stroke to represent the width of piston two inches, and again marking half that distance each side of the center of engine, we have the piston rod one inch in diameter.

One inch and a half each side of the center of stroke represents the stroke of the engine, three feet. To this we add the width of piston, to allow the same to work clear, and this gives us the ends of the cylinder. We then draw the projections at each end, which form flanges for bolting the ends of cylinder-covers to. Each end of the cylinder-harrel is turned slightly larger than the working part, to facilitate the working of the piston. The metal is also enlarged and strengthened at the ends and center by the small belts or projections shown. Inking these lines clearly in and coloring the sections of metal, ends our first lesson in mechanical design. Though in a similar manner in every essential detail we proceed to construct the front-cover stuffing-box, to allow the piston-rod to work through a steam-tight joint, also the valve ports, whose capacity is in direct proportion to the cylinder. Drawing these out a good size enables us to adjust the valves to a great nicety, and, starting from the piston-rod, we work out in a similar way and design the connecting-rod, crank-shaft and other working parts, each being designed in direct proportion to the piston-rod and the work it has to perform, and in this way an engine for any capacity and work is designed and gradually built up. The working parts once proportioned and fixed, the frame, bed and other stationary parts are drawn in to suit and form a comparative easy routine.

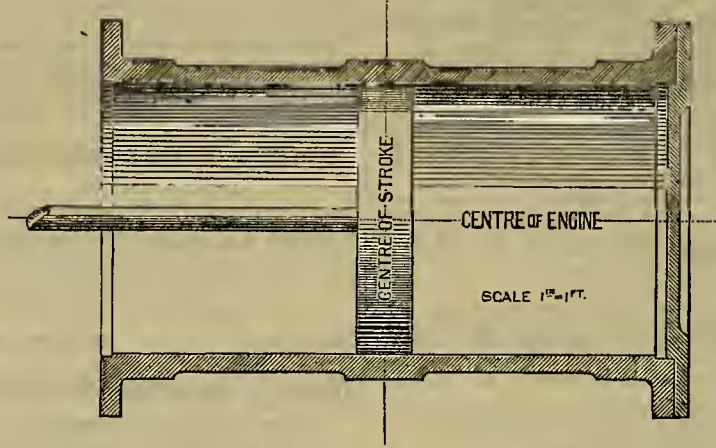
Time and patience in repeating the operations here mentioned and comparing them with

the accompanying sketch, which, if performed correctly will produce a *fac simile*, will soon enable the student to make intelligent working plans of any model or machine he may wish to perfect, and, if of sufficient application to pursue this work of designing a steam engine by himself, he can obtain the constants and formula representing the proportions of the different parts of an engine in a printed hand-book, and, if an ordinary good mathematician, can proceed in similar way to complete the construction of an engine of any desired form and capacity.

While confining this subject in the commencement to the comparatively established and well-proved routine of the design and construction of steam engines and machinery of daily use, the principles underlie the preparation of working drawings for patent purposes. Any mechanical apparatus, as well founded and efficient, and based on laws as well known and proved, is likely to be equally successful in proportion to its scope and use.

A simple thought, at which all exclaim "how easy!"—something you only wonder you did not think of 20 times before; coupled to ingenuity, mechanical skill and tact, has been the most prolific source of fortunate and successful invention, where there was perseverance sufficient to work out to successful operation and use. The laws of motion and those governing the relations of mechanism are as certain and undeviating as the laws of the planets, and the successful inventions of the future must be sought more in the adjustment and improvement of apparatus and operations in use than in any so-called discovery which may aim at suddenly superseding and surpassing those in continued use.

Remember, in constructing any mechanism, simplicity is next door to success; no mere mechanical arrangement ever did more than consume power; therefore, in every case, the fewer parts the better. Make sure of the operation you wish to perform before commencing to construct. If possible, draw it out to a good large size the first thing; this enables you to make



STEAM ENGINE CYLINDER.

improvements, and saves the waste of material incidental to experimenting in the same. Don't fancy every one is on the lookout to rob you of your ideas, but talk the matter over freely with any interested who you may have cause to trust, and thus avail yourself of other brains and judgment.

Lastly, there are men in connection with this establishment who for the last 20 years have been daily employed on the details of patent mechanical inventions, and who have, in the natural consequence of events, never had time, thought or desire to patent anything on their individual account. Therefore the opinion of an experienced, trustworthy and impartial expert, to be had at all times by calling at the PRESS office, cannot fail to commend itself to all who may be interested in any individual effort to turn to a profitable and remunerative account any inventive genius they possess, and take their place in the onward progressive march of our mechanical industries.

The second article will treat on the method of proportioning the different parts of any machine, showing how to obtain the proper thickness of metal, and the best and strongest form. J. HEBURN, Engineer.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Grand Prize, April 22d, \$21,000; McCracken Con., 23d, \$28,692.31; Northern Belle, 20th, \$3,295.53; Manhattan, 23d, \$15,100; Endowment, 23d, \$3,303.97; California, 20th, \$135,203.35; Northern Belle 17th, \$2,100.10; Hussey, 22d, \$5,500; Con. Virginia, 20th, \$121,924.41; Christy, 19th, \$5,007; Manhattan, 19th, \$16,669; Northern Belle, 15th, \$2,100.68; Standard, 16th, \$18,506.71; California, 17th, \$196,969.89; Con. Virginia, 17th, \$153,391.84; Justice, 18th, \$8,700.

WASHOE QUICKSILVER MINE.—Work is constantly going forward at the Nevada quicksilver mines, near Steamboat. A gentleman just in from these claims says a rich strike has been made at the upper claim. A tunnel has been carried into the claim 90 feet and at the header is 30 feet below the surface. At the face of the tunnel a large body of chloride and sulphide of mercury has just been discovered.—*Reno Gazette.*

A Field for Miners, Mechanics and Metallurgists.

We had recently the pleasure of an interesting conversation with a very intelligent gentleman from the United States of Colombia. He had had unusual opportunities for travel and observation in his own country and gave us what seemed a very sensible account of the resources and wants of this young Republic.

As is well known, this country lies at the northern part of South America, almost under the equator. The western part is traversed by three chains of the Andes, these are called the Cordillera of the coast (*Choco*), the Central (or *Quindin*), and the eastern Cordillera. Between the two latter lies the broad valley of the Magdalena river, which contains most of its principal cities. There are many of the mountains which rise above the snow line. The highest of them is the Tolima, latitude 4° 46' north, which rises 18,317 feet above the sea level. In the southeastern part of the country occur extensive plains or *llanos*.

The Climate

Of this country is usually considered bad by foreigners, because they rarely get into the interior. The lowlands of the coast are naturally moist, hot and unhealthy. This is particularly the case on the west coast (*choco*) and at Cartagena on the Caribbean sea, at which place the yellow fever is very prevalent. But the interior table lands or *templadas* being elevated enjoy a very mild and beautiful climate.

The Agricultural Products

Of the coast are cotton, rice, sugar-cane, tobacco, cocoa and tropical fruits. Higher up extensive forests prevail, among which are the wax-palm, and the *Chincona*, from which quinine is obtained.

Corn and wheat flourish on the elevated plains of the interior. Horses and cattle are

When mining and metallurgical machinery has to be transported over the Andes on the backs of mules it must needs be of the very simplest character.

From what has preceded it will be evident that

The Great Need of the Country

Is to have men who understand the mining and metallurgy of iron. If this metal was reduced, and a good foundry and machine shop established in such a central location as Bogota, the most serious difficulty would be removed. This is, however, the first and most necessary step, for the successful beneficiation of all the other metals depends upon the abundance of iron which can be obtained. Our Columbian friend stated that such a venture would in his opinion meet with great success, and that a few iron men was what was most needed at present.

In view of this many mining bubbles which have exploded upon this coast, it will not be necessary to put in a word of caution. The risks are evidently great enough, and none but men who are free of other entanglements, and who understand the business should think of taking such a step.

In conclusion it might be well to remark that the population is about three millions, one-third of which is composed of Indians. The people of the coast are lazy and useless, but those of the interior are more active and intelligent. They are said to be particularly apt at receiving ideas, mechanical and mining, and soon make clever workmen. The Indians are lazy, but not dangerous. The government never interferes with foreigners. The capital city, Bogota, contains some 60,000 people covers about one-third the area of San Francisco, and is generally built of brick and stone, the houses seldom being higher than two stories for fear of earthquakes. This city has a theater and an occasional opera. It has a fine university, with a faculty of nearly a 100 professors, and over 2,000 students, and is remarkable as the place where the celebrated chemist Boussingault did the work which has rendered him famous.

San Francisco Art Association.

The San Francisco Art Association is an organization which is doing a public service both for the stimulus which it affords to our California artists to improve their work and in the elevation of the general taste of the people to the appreciation of true art ideas and embodiments. The President of the association is Irving M. Scott, Esq., one of our most public spirited citizens. The society gives receptions at their rooms at intervals, and invites art loving people to attend and witness the progress which has been made in different modes of art expression. Thus the worthy artist secures the public eye and demand for his work, and is encouraged to persevere. At the last reception, which was held last week, there was a large attendance and a fine collection of paintings before them. The rooms were handsomely decorated, fine music was rendered by a band of musicians, and the scene would have convinced the most sceptical that the graces of culture and refinement are indeed sought for and appreciated by dwellers in a city which is generally described as given over to hater ends and aims.

One feature of this year's reception is notable and new, and served better than ever before to exhibit Californian art progress, it was solely an exhibition of works by artists who live in California, or were at some period resident here. Some of these artists have had the advantage of a training abroad, but most of them have worked their way upward without schooling in foreign countries. The list of artists who were represented is formidable, being as follows in the order of the programme: Wm. Keith, B. Sears, S. W. Shaw, J. W. Rix, Virgil Williams, John L. Fitch, G. J. Denning, J. Harrington, E. Williams, E. Narjot, E. W. Perry, Norton Bush, Nellie Hopps, Mrs. M. R. More, Charles Prosch, S. M. Brookes, R. D. Yeland, F. Bouvy, Thomas Hill, T. Ross, Ida Bell, E. A. Strout, Susie Dugan, Captain C. Rockwell, A. Hoosack, Humphrey Moore, William Bradford, E. A. Rockwell, B. Irwin, George H. Burgess, R. J. Bush, C. D. Robinson, Mrs. Dunn, Gustav Brock, A. Hart, Paul Frezeny, C. A. Hamilton, C. D. Shed, M. Lotz, S. J. Guy, J. B. Vandesforde, Mrs. Fanny Osborn W. F. Jackson, and H. G. Johnstone.

We have no space for special comment on the work on each of these artists, but we can say of the exhibition as a whole, that it was highly creditable to the artists and to the State. We hope the Art Association will go on in its valuable work until our "modern Italy" shall rival its prototype not only in its sunny clime, but in its noble achievements with brush and pencil.

THE WEBFOOT MINE.—We have been shown some very fine specimens of ore from the Webfoot mine, Pioneer district, Arizona. This mine is having a tunnel run in on it and the ore is from the tunnel. The assays are from \$309.16 to \$479.60 per ton. Some of the ore has horn and ruby silver. The ledge is stated to be from eight to 30 feet wide. A mill is being put up on the Guanaxato mine, near by, and ore from the Webfoot is to be concentrated and the concentrates shipped here for reduction. This mill will be ready for work in a few weeks. Some of the ore shown us was very rich.

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You will now receive my grateful, heartfelt thanks for the able manner in which you have conducted the interest entrusted to you by me. Your acknowledged ability, confirmed to me as it is by the successful presentation of my claim for a patent on a pump power, not only delights me, but suggests the propriety of my continued patronage and that of all my friends. With kind wishes for your future success, I subscribe myself, yours respectfully,

A. L. HUNSAKER

MESSRS. DEWEY & CO., Patent Solicitors, S. F.

TO QUERISTS.

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Henry N. Copp's hand-book of mining laws, just issued, contains the United States mining laws and instructions thereunder, a digest of decisions, forms, list of mining patents issued, etc. The digest of decisions alone is a very valuable thing, giving, as it does, in brief form, all the decisions of the Secretary of the Interior and Commissioner of the General Land Office in relation to mining matters. These are all under proper headings for easy reference. Forms are given for notices of location, proof of labor, notice of forfeiture, miners' lien, application for survey, patent, etc., affidavit of improvements, etc. There is also a list of patents issued for mining claims from July 28th, 1866, to August 1st, 1877. The book is of pocket size and very convenient for all who are interested in mines. It will be sent post-paid for \$1, on application to Dewey & Co., 202 Sansome Street, San Francisco.

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FAVORABLE LOCATION,

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Sure Crops Every Year.

The Reading Ranch,

In the Upper Sacramento Valley, originally embracing over 26,000 acres of

Choice Grain, Orchard and Pasture Land,

Is now offered for sale at low prices and on favorable terms of payment,

In Sub-Divisions to Suit Purchasers.

The ranch was selected at an early day by Major P. B. Reading, one of the largest pioneer land owners in California. It is situated on the west side of the Sacramento River and extends some 20 miles along its bank.

The average rainfall is about 30 inches per annum, and crops have never been known to fail from drouth.

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The soil throughout the tilled portions of the ranch proves to be of great depth and enduring in its good qualities. It is quite free from foul growths. The virgin soil among the large oak trees on the bottom land is easily broken up and cultivated.

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Are offered for sale in Reading, situated on the Sacramento River, at the present terminus of the railroad. It is the converging and distributing point for large, prosperous mining and agricultural districts in Northern California and Southern Oregon. Also, lots in the town of Anderson, situated more centrally on the ranch. Lots in both these towns are offered at a bargain, for the purpose of building up the towns and facilitating settlement of the ranch. Purchasers are invited to come and see the lands before buying here or elsewhere. Apply on the ranch, to the proprietor,

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Flax, Hemp, Jute, Ropo, Oakum
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 gines, Boilers, etc. I also manufac-
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 Engine of 1877, of one horse-power,
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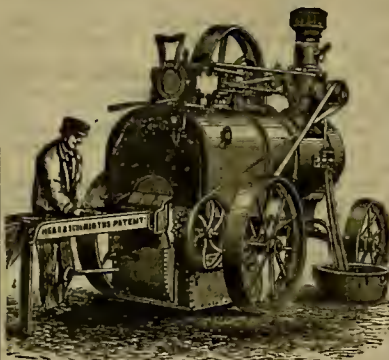
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Send for descriptive pamphlet.

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One new Straw-burning Portable Engine, made by
 Ransome, Sims & Head, Ipswich, England. This is a
 very superior engine, sent here as a sample engine for ex-
 hibition; one second-hand Straw-burning Engine, 8x10
 inch cylinder, (Rice); one second-hand Wood-burning En-
 gine, 8x12 inch cylinder, (Hoadley); one second-hand
 Wood-burning Engine, 7x10 inch cylinder, (Hoadley);
 one second-hand Wood-burning Engine, 6x10 inch cylin-
 der, (Hoadley); one second-hand Wood-burning Engine,
 6x12 inch cylinder, side engine; one new Stationary En-
 gine, independent cut-off, 12x24 inch cylinder. (The
 Straw-burning Engines named are free from infring-
 ements.)

One large sized Rock Breaker, Varney & Rix, size
 9x15; one Wood Splitting Machine; one 36-inch cylinder
 Russel Separator, (with extra cylinder,) and Lauffenberg
 shoe—very cheap, on account of owner's death; (will be
 sold with or without any of above engines.) All of the
 above second-hand engines have been in shop and over-
 hauled, and are in good working order. Various other
 machinery for sale. Purchase made on Commission.
 Machinery repairs solicited. Specialty of Portable En-
 gines and Boilers for threshing.

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CHLORIDIZING FURNACE.

This furnace is guaranteed to chloridize from 83 per
 cent. to 95 per cent. of the silver, and put gold in a state
 so that 83 to 95 per cent. of the battery assay can be ob-
 tained by amalgamation on any gold or silver ore ever
 formed by nature.

The cost of Roasting and Chloridizing is as follows:
 One man, per day.....\$ 3 50
 One man, per day.....3 00
 Wood, 14 cords at \$3.....7 00

Cost of 20 tons.....\$13 50
 Cost of one ton.....67¢
 From 2½ to 5 per cent. of salt is necessary.

In a furnace of three or four times this capacity the
 cost is decreased by 20 per cent.

Several furnaces are in successful operation in Califor-
 nia, Nevada and Idaho.

Any persons wishing any reference can address:
 JUDGE W. A. WEBSTER, Paymaster Mine, Reno, Nev.
 LEWIS CHALMERS, Manager Exchequer and IXL Mines,
 Silver Mountain, Cal.
 J. S. CONE, Vice-President Tehama County Bank, Red
 Bluff, Cal.
 R. H. CAMPBELL, Superintendent Afterthought Mine,
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For further information, apply to

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A first-class, large sized Britton Fire Engine, in fair
 order is offered for sale cheap. Price, \$400. It is worth
 more than double that sum. About forty men can work
 on the brakes. Towns or corporations wishing a good
 machine should examine this engine before ordering
 elsewhere. Apply to

ROOT, NELSON & CO.,
 Union Foundry, Sacramento

PAUL'S PULVERIZING BARREL.

For reduction of Quartz to a powder DRY. This Bar-
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 Manufactured and for sale

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A competent person is desirous of receiving the position
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 Can give satisfactory reference for ability to smelt all lead
 ores, refine silver and make market lead. No objections
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 BRASS CASTINGS of all kinds,
 WATER GATES, GAS GATES,
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A General Assortment of Engineers' Findings.

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STEAM PUMP

The Best and Most
 Durable in use. Also,
 a variety of other

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Brass, Wrought, Cast and Malleable Pipe
 fittings for Gas, Steam and Water.

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 for DIAMOND POINTED DRILLS, now brought to the
 highest state of perfection, are prepared to fill orders
 for the IMPROVED PROSPECTING AND TUNNELING
 DRILLS, with or without power, at short notice, and
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 the great economy and successful working of numerous
 machines in operation in the quartz and gravel mines
 on this coast. Circulars forwarded, and full infor-
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R. HOE & CO.'S
CHISEL TOOTH MILL EDGER,

And Shop Circular Saws with

Recent Improvements,

Made especially to meet the re-
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 satisfaction in the many mills in which they are in use.

A SIXTY DAYS' TRIAL,

Which we allow responsible parties, will convince them
 that they cannot too soon avail themselves of the advan-
 tages of a saw that is in perfect condition to run
 when they receive it, and always remains
 sharp, exactly round, and precisely the same
 to a hair in every respect, without any of
 the expensive skilled labor which other saws
 constantly demand. Both Filers and Files
 are dispensed with.

The teeth being always the same length, and the cut-
 ting angle always the same, they never dodge, but go
 through the knots in a surprising manner.

They never have to be taken off the man-
 drel, and will stand up square in edging and stock,
 which makes them indispensable for gangs.

The advantages being too numerous to mention in an
 advertisement, parties will please send for circulars and
 say they saw this in *Mining and Scientific Press*.

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Also, agents for the ALBANY LUBRICATING COMPOUND
 AND CUTS, the only reliable method of lubricating ma-
 chinery, doing it almost without attention, absolutely
 without drip or stop, and at a merely nominal expense,
 and for the WORLD STANDARD CYLINDER OIL, OF SAME
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PACIFIC MACHINERY DEPOT.

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 Judson's Standard Governors,
 Dreyfus' Self Oilers,
 Gould Manufacturing Co.'s Hand Pumps,
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A FULL LINE OF

Belting, Packing, Hose, and Other
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GENERAL BUSINESS AGENCY, CONTRACTORS
 FOR MACHINERY AND MINING WORK.

W. Cor. PINE & SANSOME STREET, S. F.

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THEIR MERITS AND MANAGEMENT.

Working Capital Furnished for good Mining Claims,
 Assays, Surveys, Specifications and estimates of all kinds
 made.

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 CONSULTING ENGINEER, EXAMINER OF MINES
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The Explorers', Miners' & Metallurgists' Companion
 672 pages, 83 Illustrations (2d. Edition.) Price...\$ 1.50
 The Prospector's Patented "Woe Pet" Assayer...100.00
 The Testing Machine for Gold, Silver, Lead, Etc...40.00
 Cabinet of Fluxes etc., for these machines...20.00
 Pocket Laboratory for Blowpipes...50.00
 Vest Pocket Blowpipe...3.00
 CHARGES.—ASSAYING, \$5; TESTING, \$2 per metal.

SWEET
 Chewing

JACKSON'S
 BEST

NAVY
 Tobacco

Awarded highest prize at Centennial Exposition for
 fine chewing qualities and excellence and lasting char-
 acter of sweetening and flavoring. The best tobacco
 ever made. As our blue strip trade-mark is closely
 imitated on inferior goods, see that Jackson's Best is
 on every plug. Sold by all dealers. Send for sample
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MANUAL, DRAWING INSTRUMENTS

AND MATERIALS, TRANSIT LEVELS, ETC.,

Sent to any address upon receipt of stamp.

G. S. WOOLMAN, 116 Fulton St., N. Y.
 (Mention *Mining and Scientific Press*.)

Continued from page 261.

The ores will run from 16% to 60% of lead, and from \$40 to \$60 in gold and silver per ton. The gauge consists of the oxides of iron, manganese, etc., similar to that of the Eureka Con. and Richmond mines. From the superficial workings there have been raised by a hand windlass and horse whims, ores which have yielded over \$200,000 in gold, silver and lead.

RICHMOND CON. is looking better than ever, yielding something like \$90,000 from about 1,100 tons of ore. The coke experiment at the Richmond furnaces is a pronounced success. The company control a coal mine on the Union Pacific railroad, from which they expect to draw their supplies.

BULLION shipments from the district have been much larger for the first half of April than they were during the same period in March.

DANVILLE DISTRICT.

ANOTHER.—Eureka Sentinel, April 19: Work in this old district has been resumed on a few of the claims, some of which have yielded largely in the past. Being situated at an elevation of 7,500 feet, the snow falls to a great depth here, preventing working in the winter.

PARADISE DISTRICT.

THE MINES.—Silver State, April 19: The mineral discoveries made here promise to be of the first importance, and are daily being added to. Some of the ores here are as rich as any ever found in the State. The Silver Prize is looking especially well, some of the ore being covered with native silver.

RYE PATCH.—Everything looking and running here as usual. The mill is working 12 tons of ore daily. The pulp assays \$64; the tailings \$10. The capacity of the mill will shortly be increased, there being thousands of tons of ore in sight in the mine.

REESE RIVER DISTRICT.

MANHATTAN.—Reville, April 13: During this week the mill has reduced 130 tons, 1,932 pounds of ore, and shipped hullion of the value of \$32,816.07.

FROST SHAFT.—The stopes in the 670 level are producing a larger quantity and better quality of ore than heretofore. The 670 drift continues in good ore and the stope is being extended east as the drift advances. The 770 west drift carries good ore in places, indicating a near approach to the chimney.

CURTIS SHAFT.—The 600 stope is producing the usual amount of ore from the south ledge, the top of the north ledge yet remaining intact.

Arizona.

ORE AND BULLION.—Citizen, April 12: Thirteen thousand six hundred and forty-two pounds of silver ore from the McMillen mine was unloaded at Jos. Collingwood's corral last Saturday. The value of this shipment is estimated at about \$80,000. It is the result of only two days' work in the mine. One piece of this ore sewed up in a rawhide weighs 658 pounds. About \$4,600 in silver hullion from the Miami mill came in on Tuesday.

THE TIPTOP.—Miner, April 12: The 10-stamp mill of this company gives entire satisfaction. It is driven by a 76-horse power engine, one of Whites furnaces is used to roast the ores, which are worked up to 94% of the battery assay. The hullion produced during March, with a great deal on account of incomplete belting, etc., aggregated \$47,309.69. The average of all ore worked at this mill since it started has been \$185.60 per ton. The only ore worked as custom has been about 20 tons, however, the company have purchased considerable ore from outside mines as an accommodation to miners and prospectors throughout Humboldt district. There is sufficient ore on the dump at the mill to keep it running for 30 days, which is not likely to diminish, as the amount arriving daily is in excess of that being worked.

MINING MATTERS.—Enterprise, April 10: Word from the Peck mine is to the effect that everything is progressing favorably at mill and mine. Preparations are being made to run the Aztlan mill. The Crook mill is steadily at work. The work of developing the Tiger mine is progressing. The owners of the Perry mine, in Hassayampa district, have about eight tons of very rich ore sacked, ready to be shipped to San Francisco. The mine is one of the best in the Territory. It is well prospected by shafts and tunnels. The ore is worth from \$200 to \$1,200 per ton. That which yields the latter sum is a chloride.

HUMBOLDT DISTRICT.—Louis Jantzen has struck it rich in the Butcher Boy and Rip Van Winkle, the former showing fine specimens of horn silver and lots of free gold. This Butcher Boy is rich in silver. McPhee & Dement are taking out ore that they intend to ship to San Francisco, to see if it will not beat recent returns from the same ore worked at the Tiptop mill. Bigelow & Opdyke are sinking on the Isabella. The bottom of the 75-foot shaft shows a vein three feet wide. On the Basin mine they are working night and day to connect the drift with the main shaft. The Greenhorn mine has been leased by Austin & Co., from Parks & Gelespie, who are taking out rich ore at a depth of 50 feet. Judge Walsh is taking rich ore from the Dividend and Empire mines. Godfrey & Dougherty have a lot of ore sacked and ready for shipment from the Yosemite mine. The Tiptop mine is looking better than at any time in the past. The company have a force of men on the Foymine. William Bell has struck it "way up" in the Big Bell. McCannan & Gelespie are drifting on the Jenny Green.

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING, APRIL 9TH.

CARRIAGE DOOR.—A. Bink, S. F.
SOFABED.—A. Hansen, S. F.
SPINNING TOP.—C. Raetz, S. F.
GOVERNOR.—J. A. Rigby, Carson, Nevada.
PUMP VALVE.—A. W. White, San Jose, Cal.
VEHICLE GEARS.—J. J. Gallagher, Davisville.
LADDER.—D. D. Hayes, S. F.
GRAIN METER.—J. C. Hunt, Sheridan, Cal.
DEVICE FOR HOLDING COIN.—J. Ostergard, Cherry Creek, Nevada.
HORSE COLLAR.—C. F. Stanfeubel and J. Staehli, S. F.
NAPKIN HOLDER.—L. Thompson, S. F.
CONGEALING PLATES FOR ICE MACHINES.—J. P. Jones, Gold Hill, Nevada.
VEHICLE WHEEL.—T. H. King, S. F.
QUICKSILVER FURNACE.—R. F. Knox, S. F.

RE-ISSUES.

FURNACE.—C. Stetefeldt, S. F.

LABELS.

No. 1 LAUNDRY BLUING, ETC.—The Western Manufacturing Company, S. F.

News in Brief.

RENO is again infested by tramps.
The Paris Exposition will open May 1st.
THERE were 86 deaths in the city last week.
The river Danube is now open its entire course.

THE new cannery factory of Rio Vista is nearly completed.

A COMPANY is being formed to light Paris by electricity.

DR. CARVER, the great shootist, is now starting at Denver.

PETER COOPER is said to be a millionaire of 20-horse power.

It is estimated that Stanislaus county will produce 6,000,000 bushels of grain this year.

SEATTLE shipped to San Francisco 8,925 tons of coal during the month of March.

THERE is in the vaults of the State Treasury of California \$1,847,406.46.

THE *Open Letter*, the Workingmen's organ, has been changed from a daily to a weekly.

ALEXANDER H. STEPHENS says he will on no condition be a candidate for the Presidency.

THEY had a severe shock of earthquake in Constantinople about a week ago.

COUNT JOANNES has cleared \$10,000 this season by his Shaksperian riots.

ALFALFA hay is selling in Phoenix, Arizona, for \$12 per ton.

ABOUT two and a half million silver dollars have been coined to date.

DURING a recent gale along the northern coast of Spain, 150 fishermen were drowned.

THE authorities of Seattle are trying to rid that city of opium dens.

GOVERNOR CASTAJO is making determined efforts to rid Lower California of bad characters.

ISAAC ROGERS, a Union Pacific brakeman, was fatally crushed at Omaha, while coupling cars.

OVER 11,000 passengers were carried over the California Street railroad on the opening day.

In San Francisco the rainfall amounts to 35.11 inches for the season, against 10.85 for 1877 and 30.72 for 1876.

THE House has passed the bill appropriating \$5,000 for a monument over the grave of Thomas Jefferson.

BOSTON pays about \$640,000 yearly in assisting poor families—an average of about \$35 to each family assisted.

LICENSE-COLLECTOR SENTON issued 3,005 licenses in March, for which the city received \$30,910.

ELKO people have a dead thing on their county prisoners. They make them work improving the cemetery.

THE Mechanics' Institute will hold another Industrial exhibition this year, commencing August 6th.

ONLY the personal friends of Wm. M. Tweed attended his funeral, which took place from the residence of his daughter, Mrs. Douglass.

ARCHDUKE FRANCIS CHARLES of Austria left a fortune of \$12,000,000, one-third of which is to be applied to relieving the poor.

THE horse "Controller," on a \$1,000 wager, made 20 miles in 58 minutes and 57 seconds at the Bay District track on Saturday last, claimed to be the biggest feat on record.

CAPT. JAMES GOODWIN, an old citizen of Oregon, was murdered on the 18th inst. near his residence at the foot of the Cascade mountains, for his money.

A. G. Benson, who brought out a large number of early settlers to California, and who became the moving spirit in the Lohos island enterprise, died recently in the city of New York.

ON the 14th inst six inches of snow fell at Grass Valley and vicinity, the branches of the trees, however, were not broken down nor the young fruit injured as generally happens with these late snows.

THE Nationalists of Pennsylvania are to hold their State Convention in Philadelphia on Wednesday, May 8th.

A VIGOROUS fight is going on between Chicago and St. Louis roads for the Missouri river traffic.

A PARIS dispatch says: Greece has accepted the invitation of the United States to an international bi-metallic Conference.

TWO of those in custody for suspected complicity in the murder of the Earl of Leitrim have been discharged.

THE Coopers' strike in this city is at an end, the employers who held out having made the concessions demanded.

A FIRM in San Antonio, Texas, have been shipping arms to Mexico for some weeks past. A movement against Diaz is suspected.

THE New York Herald has several dispatches from the South and West, announcing banks and other establishments paying out gold at par.

THREE Louisianians are credited with killing 9,000 alligators last year. They saved the oil, and sold the hides for 75 cents apiece.

A BOSTON paper estimates that at least \$10,000 a day are sent to California from that city to be invested in mining stocks.

BLOSIOUS PRISTORIUS, an ex-priest, has been denied a new trial in Montgomery county, Pa., for the murder of Isaac Jaquette, and will be hanged.

THE resurvey of San Diego harbor has been completed, and shows 23½ feet at lowest water on the bar—a notable improvement since the survey of 1856.

A. D. REMINGTON, an old paper dealer of San Francisco, has purchased the Lick mill property, in Santa Clara county, and is fitting it up for the manufacture of manila and printing paper.

THOS. BATCHELDAIR, of Fulton, Oswego county, 80 years of age, has been uninterruptedly engaged in the printing business for 67 years, and claims to be the oldest printer in the United States.

THE Iron and Steel Association's *Bulletin* says that the total production of pig iron in the United States last year was 2,314,585 tons of 2,000 pounds, a gain of 221,349 tons over 1876.

THE jury in the case of Breen and Cowie, accused of being bribed to let a Chinese murderer escape at Virginia City, having failed to agree were discharged, nine being for acquittal.

TWO hundred horses per week are being purchased in the neighborhood of Troy, N. Y., and in the western portion of Vermont, by agents of the English Government.

A SERIOUS riot occurred lately near Glasgow. Some miners on a strike attacked the Sheriff's officers who were serving notice of ejectment. Several houses were wrecked and telegraph lines destroyed.

LARKIN G. MEAD has designed a monument to the late Oliver P. Morton—a shaft rising from a base and sub-base, and bearing at a height of 115 feet a statue of Morton, heroic size, in the attitude of speaking. Cost \$100,000.

THE schooner *Paloma*, in port from Tahiti, reports that on February 7th, a severe hurricane raged in the Pamotas, and that about 120 persons were killed and a great deal of property destroyed.

THEY have had a fearful fall of rain, accompanied with wind, thunder and lightning, at Deadwood, in the Black Hills. The town was flooded, the roads torn up and much damage done to property.

It is alleged that important documents are coming from Cuba, as a result of Judge Leonard's visit, showing that the kidnapping of Florida negroes and enslaving them in Cuba has been carried on extensively.

FRANK SPEARMAN, a native of Ireland, aged about 45 years, was crushed to death last Saturday evening by a dummy on the California Street railroad. He was a carpenter and leaves a wife and six children.

THE late Mark Hopkins left Great Barrington, Mass., 25 years ago in coarse clothes and rough hoots, and a little money given to him by his uncle. Last year his wife visited Great Barrington in a special palace car, with a large retinue of servants.

A THIRTY-mile race was run at Vallejo on the 20th inst by W. V. Smith and M. Stiltz. Six horses were used, and the riders changed animals every mile. Smith rode the distance in an hour and 25 minutes, but the race was awarded to Stiltz, Smith having sprained an ankle and being aided to mount during the contest.

ON the 21st inst, Colonel W. L. Salisbury, a banker, Mayor *pro tem* and owner of the *Enquirer-Sun* in Columbus, Ga., was fatally shot in the back while entering a train at Seale, Ala. by Dr. R. M. Palmer. The latter had sued Salisbury for \$250,000 damages to his character. The jury awarded him one cent. Palmer fled.

A STORM at Pomeroy in Iowa, on Sunday, blew down a number of houses, killed a son of George Wallace and a son of Mr. Pearce, and wounded twenty or thirty other persons. Trees were torn up, and the country presented the appearance of being ravaged by a terrible cyclone. A man named Reilly was carried over a house and over tree-tops, and set down uninjured. Cattle were hurled to long distances and killed. Hailstones fastened together in great masses. Alfred King's residence was lifted from the ground and dashed to a thousand pieces. His mother was instantly killed.

A buggy of his was carried a quarter of a mile through the air. The water in the lake rose to a prodigious height.

MODEL MARRER and MACHINIST.—I. A. Heald, No. 614 Commercial St., San Francisco, (fourth floor).

Thirteenth Industrial Exhibition of the Mechanics' Institute, S. F.

The Board of Managers have the honor to announce that the Thirteenth Exhibition of the Mechanics' Institute, and the fifth annual one given in the grand pavilion on Mission, Market and Eighth streets, will open to the public August 6th, and close September 7th, 1878.

THE public are respectfully requested to respond liberally as exhibitors and visitors, and thus enable the Board of Trustees to realize from this fair a sum sufficient to liquidate the small indebtedness now due on the Mechanics' Institute library property, and to answer a speedy fulfillment of the sanguine hope of the Trustees and well-wishers of the Society to make it a free library for mechanics and apprentices, the Board to institute permanent classes for instruction in the mechanic arts.

THE exhibition building is 550 feet long, 200 feet wide, centrally located, and accessible by six lines of street cars, giving direct communication with all parts of the city.

THE promenade is a gallery under the main nave, 16 feet wide and 1,000 feet long, from which an unobstructed view of the interior is obtained.

IN addition there is an annex 220 feet long by 75 feet wide, containing the exotic garden, which will contain all that is rare and beautiful in the floral and horticultural world, increased by the finest rustic and picturesque effects obtainable. The whole, pavilion and garden, will be brilliantly illuminated at night.

THE art gallery, 400 feet long by 50 wide, will be made specially attractive by paintings, statuary and works of art. The Managers are happy to announce that the San Francisco Art Association have kindly consented to take charge of the same, and that our local artists have promised to display their best productions.

AMONG the many attractions this year the musical part of the exhibition will be a noted feature, as the best obtainable orchestra will each afternoon and evening give a grand instrumental concert, introducing the latest and most pleasing novelties of musical composition.

A fine refreshment saloon, restaurant, and 4,500 comfortable seats will be provided for the convenience of visitors, of which the average attendance during the last exhibition was 12,500 per day.

THE Board of Managers particularly desire that the natural and manufactured products of this coast should be well represented, and to that end all possible facilities will be extended to exhibitors of such articles.

A large and powerful engine will furnish ample motive power, while steam and water will be furnished for such machines and appliances as require them, free of cost to the exhibitors. The main line of shafting is 490 feet long, with pulleys sufficient for all requirements.

IT is expected that the various transportation companies will convey goods intended for exhibition at one-half the usual rates.

THE matter of premiums has not yet been determined upon.

APPLICATIONS for space, rules and regulations, or any information regarding the exhibition, will be given or sent by addressing the Secretary.

Board of Managers:

Irving M. Scott, Henry L. Davis, Asa R. Wells, James Duffy, C. Waterhouse, George Spaulding, James Drury, H. S. Smith, James Spiers, D. A. McDonald, J. B. Stetson, H. L. Hutchinson, Nathaniel Hunter, A. L. Fish.
J. H. CULVER, Secretary, 27 Post st.

Signal Service Meteorological Report.

Week Ending April 23, 1878.

HIGHEST AND LOWEST BAROMETER.											
Apr. 17.	Apr. 18.	Apr. 19.	Apr. 20.	Apr. 21.	Apr. 22.	Apr. 23.					
30.13	29.90	29.70	29.86	30.02	30.10	30.12					
30.03	29.74	29.59	29.70	29.90	30.02	30.02					
MINIMUM AND MAXIMUM THERMOMETER.											
55	61	58	55	60	61	59					
46	49	51	48	50	51	50					
MEAN DAILY HUMIDITY.											
64	66	73	69	64	74	70					
PREVAILING WIND.											
W	SE	SW	W	W	NW	SW					
238	205	191	203	255	164	204					
STATE OF WEATHER.											
Clear.	Clo'dy	Fair.	Clear.	Fair.	Fair.	Fair.					
RAINFALL IN TWENTY-FOUR HOURS.											
		.61									
Total rain during the season, from July 1, 1877, 36.11 in.											

Total rain during the season, from July 1, 1877, 35.11 in.

For the Paris Exposition.

The Committee on Minerals for the Paris Exposition announce that everything not in by the first of April will be left behind. It is likely that many mineral specimens intended for the great show will not reach here by that time, and as there are probably other things yet to be sent forward, it may be worth while to state that the American European Express, Baldwin Bros. & Co., Proprietors, 72 Broadway, New York, forward packages to the Paris Exposition at the following special rates: Four lbs., \$1.25; 8 lbs., \$1.50; 12 lbs., \$2.25; 20 lbs., \$3.25; 50 lbs., \$4.25; 75 lbs., \$5; 100 lbs., \$5.50, and for everything over three feet, 95 cents per foot. Custom expenses at Havre, 60 cents additional, per package. Freight in all cases to be prepaid.

MR. W. J. WOOLLEY, who took out a Canadian Patent some four years ago, is requested to call at the MINING AND SCIENTIFIC PRESS PATENT AGENCY OFFICE, Business of importance.

AYER & SON'S MANUAL contains information of much value to advertisers; sent free. Address N. W. Ayer & Son, Advertising Agents, Times' Building, Philadelphia.

ANY PHOTOGRAPHER having a large Camera Box for sale will please notify "N. S." at this office.

METALS.

[WHOLESALE.]

WEDNESDAY, M., April 24, 1878.

IRON.—	
American Pig, ton.	28 00 @ 30 00
Scotch Pig, ton.	28 00 @ 30 00
White Pig, ton.	28 00 @ 30 00
Oregon Pig, ton.	28 00 @ 30 00
Refined Bar, ton.	28 00 @ 30 00
Horse Shoes, keg.	5 00 @ 6 00
Nail Rod, ton.	28 00 @ 30 00
Norway, Orval.	28 00 @ 30 00
COPPER.—	
Sheathing, Yellow.	34 @ 35
Sheathing, Old Yellow.	21 @ 22
Composition Nails.	24 @ 25
Composition Bolts.	24 @ 25
STEEL.—	
English Cast, lb.	13 @ 14
Andersson & Woods, ordinary sizes.	15 @ 16
Drill.	15 @ 16
Flat Bar.	14 @ 15
Flow Steel.	8 @ 12
TIN PLATE.—	
10x14 1/2 Charcoal.	7 50 @ 8 50
Banca Tin.	23 @ 24
Australian.	17 @ 17 1/2
ZINC.—	
By the Cask.	9 @ 10
Zinc Sheet 7 1/2 ft. to 10 lb.	10 @ 11
7 1/2 ft. to 14.	10 @ 11
8 1/2 ft. to 10.	11 @ 12
8 1/2 ft. to 14.	11 @ 12
NAILS.—	
Assorted sizes.	3 15 @ 25
QUICKSILVER.—	
By the lb.	43 @ 45

LEATHER.

[WHOLESALE.]

WEDNESDAY M., April 24, 1878.

Sole Leather, heavy, lb.	26 @ 28
Light.	22 @ 24
Jodot, 8 Kil. doz.	48 00 @ 50 00
11 to 13 Kil.	55 00 @ 57 00
14 to 19 Kil.	55 00 @ 57 00
Second Choice, 11 to 19 Kil.	55 00 @ 57 00
Cornellian, 12 to 15 Kil.	57 00 @ 59 00
Females, 12 to 15 Kil.	63 00 @ 65 00
14 to 15 Kil.	71 00 @ 73 00
Shimons, 12 to 15 Kil.	72 00 @ 74 00
16 to 17 Kil.	72 00 @ 74 00
Shimons, 18 Kil.	72 00 @ 74 00
24 Kil.	72 00 @ 74 00
Robert Calf, 7 and 9 Kil.	50 @ 40 00
Kips, French, lb.	1 00 @ 1 35
Cal. doz.	40 00 @ 45 00
French Sheep, 8 colors.	8 00 @ 15 00
Eastern Calf for Backs, lb.	1 00 @ 1 25
Sheep Roams for Topping, all colors, doz.	9 00 @ 13 00
For Linings.	5 50 @ 10 50
Cal. Russet Sheep Linings.	1 75 @ 4 50
Best Calf, French Calf, pair.	4 00 @ 5 25
Good French Calf.	4 00 @ 4 75
Best Jodot Calf.	5 00 @ 5 25
Leather, Harness, lb.	35 @ 38
Best Brille, doz.	35 @ 38
Skirting, lb.	33 @ 37
Well, doz.	30 00 @ 50 00
Buff, ft.	18 @ 20
Wax Side.	17 @ 18

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, April 24, 3 P. M.

LEGAL TENDERS IN S. F., 11 1/2 M. 99 1/2 @ 100 SILVER, 1.75 @ 2.00. GOLD IN NEW YORK, 100. GOLD BARS, 890 @ 910. SILVER BARS, 8 @ 15 per cent. discount. EXCHANGE ON NEW YORK, 4% on London bankers, 4 1/2 @ 4 3/4 Commercial, 50; Paris, five francs per dollar; Mexican dollars, 35. LONDON Consols 94 12 1/2; Bonds, 105 1/2. QUICKSILVER IN S. F., by the flask, 46 @ 47 1/2.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Cataract and Wide West Hydraulic Gravel

Mining Company. Location of principal place of business, San Francisco, Cal. Location of works, Elho Mining District, Calaveras County, Cal.

NOTICE.—There are delinquent upon the following described stock, on account of assessment No. 1, levied on the fifth day of March, 1878, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Phelan, Joseph P.	5	125	\$13 75
Phelan, Joseph P.	6	125	18 75
Keefe, Windsor A, trustee.	8	500	75 00
Keefe, Windsor A, trustee.	9	500	75 00
Keefe, Windsor A, trustee.	10	500	75 00
Keefe, Windsor A, trustee.	11	500	75 00
Keefe, Windsor A, trustee.	12	500	75 00
Keefe, Windsor A, trustee.	13	500	75 00
Keefe, Windsor A, trustee.	14	500	75 00
Keefe, Windsor A, trustee.	15	500	75 00
Keefe, Windsor A, trustee.	16	500	75 00
Keefe, Windsor A, trustee.	17	500	75 00
Keefe, Windsor A, trustee.	18	500	75 00
Keefe, Windsor A, trustee.	19	100	15 00
Keefe, Windsor A, trustee.	20	100	15 00
Keefe, Windsor A, trustee.	21	100	15 00
Keefe, Windsor A, trustee.	22	100	15 00
Keefe, Windsor A, trustee.	23	100	15 00
Keefe, Windsor A, trustee.	24	100	15 00
Keefe, Windsor A, trustee.	25	100	15 00
Keefe, Windsor A, trustee.	26	100	15 00
Keefe, Windsor A, trustee.	27	100	15 00
Keefe, Windsor A, trustee.	28	100	15 00
Keefe, Windsor A, trustee.	29	100	15 00
Keefe, Windsor A, trustee.	30	100	15 00
Keefe, Windsor A, trustee.	31	100	15 00
Keefe, Windsor A, trustee.	32	100	15 00
Keefe, Windsor A, trustee.	33	100	15 00
Keefe, Windsor A, trustee.	34	100	15 00
Keefe, Windsor A, trustee.	35	100	15 00
Keefe, Windsor A, trustee.	36	100	15 00
Keefe, Windsor A, trustee.	37	100	15 00
Keefe, Windsor A, trustee.	38	100	15 00
Keefe, Windsor A, trustee.	39	100	15 00
Keefe, Windsor A, trustee.	40	100	15 00
Keefe, Windsor A, trustee.	41	100	15 00
Keefe, Windsor A, trustee.	42	100	15 00
Keefe, Windsor A, trustee.	43	100	15 00
Keefe, Windsor A, trustee.	44	100	15 00
Keefe, Windsor A, trustee.	45	100	15 00
Keefe, Windsor A, trustee.	46	100	15 00
Keefe, Windsor A, trustee.	47	100	15 00
Keefe, Windsor A, trustee.	48	100	15 00
Keefe, Windsor A, trustee.	49	100	15 00
Keefe, Windsor A, trustee.	50	100	15 00
Keefe, Windsor A, trustee.	51	100	15 00
Keefe, Windsor A, trustee.	52	100	15 00
Keefe, Windsor A, trustee.	53	100	15 00
Keefe, Windsor A, trustee.	54	100	15 00
Keefe, Windsor A, trustee.	55	100	15 00
Keefe, Windsor A, trustee.	56	100	15 00
Keefe, Windsor A, trustee.	57	100	15 00
Keefe, Windsor A, trustee.	58	100	15 00
Keefe, Windsor A, trustee.	59	100	15 00
Keefe, Windsor A, trustee.	60	100	15 00
Keefe, Windsor A, trustee.	61	100	15 00
Keefe, Windsor A, trustee.	62	100	15 00
Keefe, Windsor A, trustee.	63	100	15 00
Keefe, Windsor A, trustee.	64	100	15 00
Keefe, Windsor A, trustee.	65	100	15 00
Keefe, Windsor A, trustee.	66	100	15 00
Keefe, Windsor A, trustee.	67	100	15 00
Keefe, Windsor A, trustee.	68	100	15 00
Keefe, Windsor A, trustee.	69	100	15 00
Keefe, Windsor A, trustee.	70	100	15 00
Keefe, Windsor A, trustee.	71	100	15 00
Keefe, Windsor A, trustee.	72	100	15 00
Keefe, Windsor A, trustee.	73	100	15 00
Keefe, Windsor A, trustee.	74	100	15 00
Keefe, Windsor A, trustee.	75	100	15 00
Keefe, Windsor A, trustee.	76	100	15 00
Keefe, Windsor A, trustee.	77	100	15 00
Keefe, Windsor A, trustee.	78	100	15 00
Keefe, Windsor A, trustee.	79	100	15 00
Keefe, Windsor A, trustee.	80	100	15 00
Keefe, Windsor A, trustee.	81	100	15 00
Keefe, Windsor A, trustee.	82	100	15 00
Keefe, Windsor A, trustee.	83	100	15 00
Keefe, Windsor A, trustee.	84	100	15 00
Keefe, Windsor A, trustee.	85	100	15 00
Keefe, Windsor A, trustee.	86	100	15 00
Keefe, Windsor A, trustee.	87	100	15 00
Keefe, Windsor A, trustee.	88	100	15 00
Keefe, Windsor A, trustee.	89	100	15 00
Keefe, Windsor A, trustee.	90	100	15 00
Keefe, Windsor A, trustee.	91	100	15 00
Keefe, Windsor A, trustee.	92	100	15 00
Keefe, Windsor A, trustee.	93	100	15 00
Keefe, Windsor A, trustee.	94	100	15 00
Keefe, Windsor A, trustee.	95	100	15 00
Keefe, Windsor A, trustee.	96	100	15 00
Keefe, Windsor A, trustee.	97	100	15 00
Keefe, Windsor A, trustee.	98	100	15 00
Keefe, Windsor A, trustee.	99	100	15 00
Keefe, Windsor A, trustee.	100	100	15 00

Names.	No. Certificate.	No. Shares.	Amount.
Keefe, Windsor A, trustee.	151	100	15 00
Keefe, Windsor A, trustee.	152	100	15 00
Keefe, Windsor A, trustee.	153	100	15 00
Keefe, Windsor A, trustee.	154	100	15 00
Keefe, Windsor A, trustee.	155	100	15 00
Keefe, Windsor A, trustee.	156	100	15 00
Keefe, Windsor A, trustee.	157	100	15 00
Keefe, Windsor A, trustee.	158	100	15 00
Keefe, Windsor A, trustee.	159	100	15 00
Keefe, Windsor A, trustee.	160	100	15 00
Keefe, Windsor A, trustee.	161	100	15 00
Keefe, Windsor A, trustee.	162	100	15 00
Keefe, Windsor A, trustee.	163	100	15 00
Keefe, Windsor A, trustee.	164	100	15 00
Keefe, Windsor A, trustee.	165	100	15 00
Keefe, Windsor A, trustee.	166	100	15 00
Keefe, Windsor A, trustee.	167	100	15 00
Keefe, Windsor A, trustee.	168	100	15 00
Keefe, Windsor A, trustee.	169	100	15 00
Keefe, Windsor A, trustee.	170	100	15 00
Keefe, Windsor A, trustee.	171	100	15 00
Keefe, Windsor A, trustee.	172	100	15 00
Keefe, Windsor A, trustee.	173	100	15 00
Keefe, Windsor A, trustee.	174	100	15 00
Keefe, Windsor A, trustee.	175	100	15 00
Keefe, Windsor A, trustee.	176	100	15 00
Keefe, Windsor A, trustee.	177	100	15 00
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Keefe, Windsor A, trustee.	182	100	15 00
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Keefe, Windsor A, trustee.	184	100	15 00
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Keefe, Windsor A, trustee.	187	100	15 00
Keefe, Windsor A, trustee.	188	100	15 00
Keefe, Windsor A, trustee.	189	100	15 00
Keefe, Windsor A, trustee.	190	100	15 00
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Keefe, Windsor A, trustee.	194	100	15 00
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Keefe, Windsor A, trustee.	196	100	15 00
Keefe, Windsor A, trustee.	197	100	15 00
Keefe, Windsor A, trustee.	198	100	15 00
Keefe, Windsor A, trustee.	199	100	15 00
Keefe, Windsor A, trustee.	200	100	15 00
Keefe, Windsor A, trustee.	201	100	15 00
Keefe, Windsor A, trustee.	202	100	15 00
Keefe, Windsor A, trustee.	203	100	15 00
Keefe, Windsor A, trustee.	204	100	15 00
Keefe, Windsor A, trustee.	205	100	15 00
Keefe, Windsor A, trustee.	206	100	15 00
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Keefe, Windsor A, trustee.	213	100	15 00
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Keefe, Windsor A, trustee.	216	100	15 00
Keefe, Windsor A, trustee.	217	100	15 00
Keefe, Windsor A, trustee.	218	100	15 00
Keefe, Windsor A, trustee.	219	100	15 00
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Keefe, Windsor A, trustee.	221	100	15 00
Keefe, Windsor A, trustee.	222	100	15 00
Keefe, Windsor A, trustee.	223	100	15 00
Keefe, Windsor A, trustee.	224	100	15 00
Keefe, Windsor A, trustee.	225	100	15 00
Keefe, Windsor A, trustee.	226	100	15 00
Keefe, Windsor A, trustee.	227	100	15 00
Keefe, Windsor A, trustee.	228	100	15 00
Keefe, Windsor A, trustee.	229	100	15 00
Keefe, Windsor A, trustee.	230	100	15 00
Keefe, Windsor A, trustee.	231	100	15 00
Keefe, Windsor A, trustee.	232	100	15 00
Keefe, Windsor A, trustee.	233	100	15 00
Keefe, Windsor A, trustee.	234	100	15 00
Keefe, Windsor A, trustee.	235	100	15 00
Keefe, Windsor A, trustee.	236	100	15 00
Keefe, Windsor A, trustee.	237	100	15 00
Keefe, Windsor A, trustee.	238	100	15 00
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Keefe, Windsor A, trustee.	240	100	15 00
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Keefe, Windsor A, trustee.	242	100	15 00
Keefe, Windsor A, trustee.	243	100	15 00
Keefe, Windsor A, trustee.	244	100	15 00
Keefe, Windsor A, trustee.	245	100	15 00
Keefe, Windsor A, trustee.	246	100	15 00
Keefe, Windsor A, trustee.	247	100	15 00
Keefe, Windsor A, trustee.	248	100	15 00
Keefe, Windsor A, trustee.	249	100	15 00
Keefe, Windsor A, trustee.	250	100	15 00
Keefe, Windsor A, trustee.	251	100	15 00
Keefe, Windsor A, trustee.	252	100	15 00
Keefe, Windsor A, trustee.	253	100	15 00
Keefe, Windsor A, trustee.	254	100	15 00
Keefe, Windsor A, trustee.	255	100	15 00
Keefe, Windsor A, trustee.	256	100	15 00
Keefe, Windsor A, trustee.	257	100	15 00
Keefe, Windsor A, trustee.	258	100	15 00
Keefe, Windsor A, trustee.	259	100	15 00
Keefe, Windsor A, trustee.	260	100	15 00
Keefe, Windsor A, trustee.	261	100	15 00
Keefe, Windsor A, trustee.	262	100	15 00
Keefe, Windsor A, trustee.	263	100	15 00
Keefe, Windsor A, trustee.	264	100	15 00
Keefe, Windsor A, trustee.	265	100	15 00
Keefe, Windsor A, trustee.	266	100	15 00
Keefe, Windsor A, trustee.	267	100	1

Iron and Machine Works.

THOS. PENDERGAST.

HENRY S. SMITH.

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

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Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

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PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Oirders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the lowest possible terms.

GOLDEN STATE & MINERS' IRON WORKS.

Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

UNION IRON WORKS, SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,
SACRAMENTO, CAL.

American Machine



Experimental and Fine Special Machinery, Planing and Gear Cutting, Printing Press, Band Instrument and General Machine Repairing; Dies, Taps, Punches, Reamers and other Tools made to order. Models and Patterns for Inventors promptly executed in Wood or Metals. 514 Commercial Street, between Sansome and Leidesdorff, (Third Floor), San Francisco, Cal.

I. A. HEALD, Proprietor.

CALIFORNIA BRASS FOUNDRY,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE.

J. H. WEED.

V. KINGWELL.

California Machine Works,

119 Beale St., San Francisco.

BIRCH, ARGALL & CO.,

UILDERS OF QUARTZ, SAW AND FLOUR MILLS,
STEAM AND HYDRAULIC ELEVATORS.

Sole manufacturers of Brodies Patent Rock Crushers and Steel Faced Tappets, and General Machinists.

HAWKINS & CANTRELL, MACHINE WORKS,

210 and 212 Beale Street, bet. Howard and Folsom Sts., - - San Francisco.

Manufacturers of

IMPROVED PORTABLE

Hoisting Engines,

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Steam Engines and all Kinds of Mill and Mining Machinery.

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FOR

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Wedding Presents,



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27 We offer this season many new improvements that must be seen to be appreciated, therefore buyers coming to San Francisco are invited to examine our stock—THE LARGEST IN THE CITY.

27 Medal and diploma awarded at the Centennial Exposition to our establishment in Switzerland for excellence in manufacture, durability, volume, purity of sound and superior workmanship. Also, medal awarded at the Mechanics' Institute Industrial Exhibition, San Francisco.

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FOR SYSTEMATIC MILLING, SMELTING, AND CONCENTRATION OF ORES
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G MAHE, Director

Howell's Improved White Roasting Furnace.

This cut represents the most improved construction of this unrivaled Furnace, the superiority of which over all others as regards cost and capacity, as well as the economical and thorough oxidation and chloridization of ore, is now generally conceded.

In this Furnace, as covered by the Howell and White patents, are combined the three acknowledged requisites for the thorough and economical roasting and chloridization of ores.

First.—Continuous progression through and discharge of the ores from the furnace—while in the meantime they are, by being constantly showered through the heated air and gases within it, exposed in the greatest possible degrees to their reducing action.

Second.—Subjecting the ores to this showering process any length of time that may be necessary, according to the character of the ore, for its thorough reduction. In passing through the furnace it ordinarily falls about 1,000 feet, all the time in direct contact with the flame.

Third.—Increasing the heat on the ores as they are progressed through the furnace.

In this respect this furnace excels all others, as none of them combine all these essential requisites. It will chloridize the most refractory ores up to from 80% to 98% of their assay value, depending upon their nature and grade.

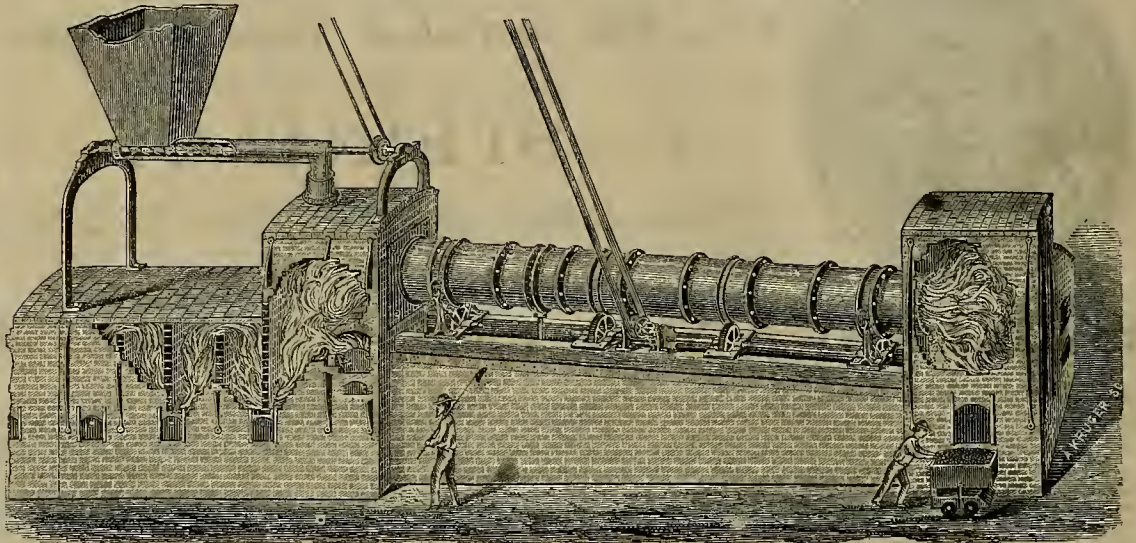
The first cost as well as the cost of operating it is less than that of any other furnace of equal capacity.

It requires no especial skill in management that cannot be readily acquired by any one capable of conducting an ordinary silver mill.

We manufacture various sizes adapted to a five, ten or twenty-stamp mill, and furnish plans by which any competent mill man can erect and operate it.

This furnace having the full or partial brick lined cylinder, embraces the devices covered by the patent to John Howell, as well as the original devices covered by the White patents, has been erected and operated successfully at the following mines in California, Nevada, Arizona and Montana: Camanche, Jefferson, Leopard, Utah, Star, Navajo, Grand Prize, Peck, Tiptop, Hackberry, Independence, Endowment and Alice. At least ten of them are now in active and successful operation, in some cases reducing ores of the most refractory character.

These facts are a sufficient attestation of the merits of this furnace.



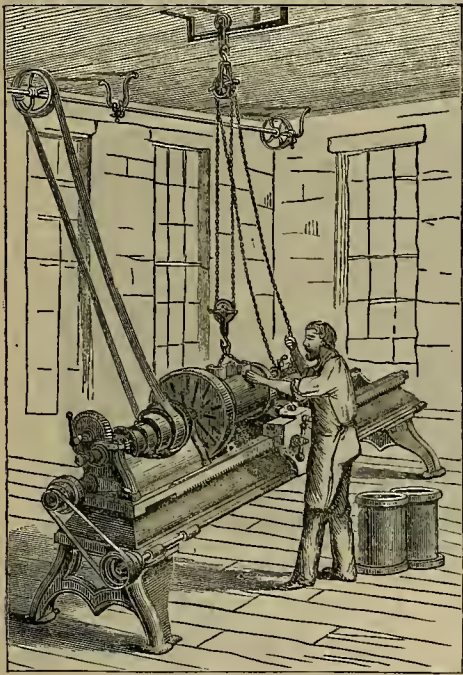
The undersigned, with Mr. John Howell, are the sole owners of the Howell patent, and they have perfected arrangements with him, and also with Mr. James M. Thompson, who is a large owner in the White patent, and as such is possessed of as full and perfect rights and powers under the same as the patentee himself, by which they have acquired the exclusive right to manufacture these furnaces for the Pacific States and Territories. We hereby caution all parties against purchasing the same from any others but ourselves, or the said Howell or Thompson, as we shall prosecute all parties infringing upon the same. For particulars, price and terms, address

RANKIN, BRAYTON & CO.,

Pacific Iron Works, First and Fremont Street.

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WESTON'S DIFFERENTIAL PULLEY BLOCKS.



One Man Can Easily Lift
1,000 Pounds.

Load Always Suspended; it
can never "Run Down."

Lowering Effected by Pulling
the Slack Chain.

One Man With This Tackle
is Better than Four or
Five with the Ordinary
Double Block.

AS APPLIED

TO MACHINE SHOP USE.

This Labor-Saving Pulley is of daily value
in Machine Shops and Factories. The Mechanic
is enabled

WITHOUT ASSISTANCE,

To safely adjust with accuracy large and
heavy pieces of work in his lathe, and to alter
their position by means of a traveler. In fact,
the Pulley supplies a want in machine shops
which nothing else entirely fills.

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DUNHAM, CARRIGAN & CO., Agents.

Dudgeon's Tube Expanders, Hydraulic Jacks,

Ashcroft's Steam Gauges, Etc., Etc.

SEND FOR CIRCULARS.

DUNHAM, CARRIGAN & CO., SAN FRANCISCO.

TESTING AND WORKING SILVER ORES.—This is the title of an illustrated work of 114 pages, for Miners and Prospectors, by Chas. H. Aaron, published by Dewey & Co. It is written for miners, in plain language, and with all necessary details in description. The author describes the different processes of roasting ores, the appliances, methods of testing ores, testing for a process, working samples, treatment of base metals, use of chemicals, leaching processes, different kinds of crushing apparatus, etc. This little work abounds with useful hints to miners and prospectors, and is written in a practical style. Price, post free, \$2.00. Address, Dewey & Co., MINING AND SCIENTIFIC PRESS, 224 Sansome St., San Francisco.

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For YOKOHAMA and HONGKONG.

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For Panama and New York, calling at Mazatlan, Manzanillo and Acapulco, connecting at Acapulco with Company's Steamers for all Central Am. ports.

CITY OF SYDNEY. May 13th, at 12 o'clock, noon,
on arrival of the English Mail, for HONOLULU, AUCKLAND and SYDNEY.
\$10 additional is charged for passage in Upper Saloon.

WILMINGTON. April 27.
For Honolulu.

CITY OF PANAMA. April 30th.
For Victoria, Port Townsend, Seattle, Tacoma, connecting at Tacoma with Northern Pacific Railroad for Portland, Oregon.

Tickets must be purchased before 11 A. M. on day of sailing.
For freight or passage apply at the office corner First and Brannan streets.

WILLIAMS, BLANCHARD & CO., Agts.

PARTNER WANTED.

Partner wanted for the country (increase of business the cause,) in an established Foundry and Machine Shop. Must be a good practical draftsman, pattern maker or finisher, first preferred. References required. For particulars address

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Mission Street. Between Third and Fourth
M. A. KENNEDY, Acting Manager.

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JOHN McCULLOUGH. Proprietor and Manager.
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HAVERLY'S MINSTRELS.

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FARM APPRENTICE.

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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, MAY 4, 1878.

VOLUME XXXVI.
Number 18.

The Future of the Quicksilver Interest.

Despite the present low prices, the production of quicksilver continues this year at about the same rate as last. Some of the mines not well conditioned for keeping up their former rate of production, have found it expedient to curtail the same, while many of the smaller ones have been forced to suspend operations altogether. Several of the larger and older companies have, however, turned out about their usual complement of metal, some of them barely earning enough to cover current expenses, while others have made some net profits.

The New Almaden company has been running largely on the tierras, and other classes of low grade ores that had accumulated on their dumps, or been passed by in former years, and through the use of their superior furnaces and other appliances, have been able to keep ahead of expenses. The Reddington, under an economical management, and with large low grade reserves near the surface, having managed to do the same. The Sulphur Banks, having a great deal of material that can be cheaply mined, have kept their furnaces employed, and as they claim, with some profit. The Great Western company also, according to their own statements, make quicksilver at a prime cost of 25 cents per lb., it is to be inferred that they have cleared some money by this year's operations, their reduction works having been run to their full capacity. As the Oceanic can produce for about 34 cents, they too must have earned something, though not running all their furnaces, the owners preferring to reserve their ore for better prices. The Altoona mine, in Trinity county, by reason of its high-grade ore, and its facility with which it can be mined, is able, no doubt, to produce quicksilver more cheaply than any other mine in California. From the geographical position of their mine, this company enjoys some peculiar advantages for marketing their metal, the gold miners in that remote section of the State mostly obtaining their supplies from them. The New Idria, Sutherland, Guadalupe and the mines of Sonoma, Lake and Napa, other than those mentioned, have been doing a somewhat restricted and moderate business, their earnings not much exceeded expenditures.

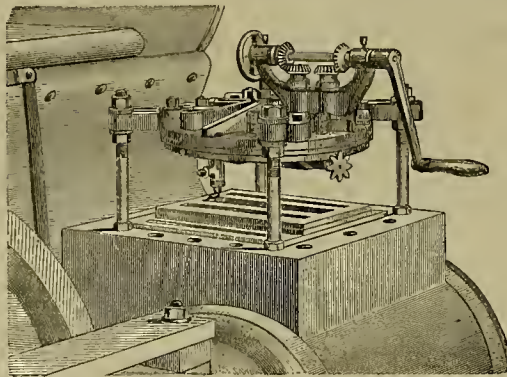
In the early part of the year, an effort was made by some of the more shrewd and largely interested proprietors, to effect such a combination as would tend to curtail production, keeping it within the consumptive demands of the country, and the requirements of the trade. This was a bit of good business policy, and in its application to industries of this kind, has sometimes been successfully carried out. The jealousies entertained by certain large companies sufficed, however, to defeat that concerted action, through which alone the end proposed could be reached; and it looks now as if the sharp competition existing in this industry, is destined to an indefinite continuance, restricting future profits to the present narrow margin. While this policy prevails, few new claims will be opened; deep developments will proceed slowly; the mines that have shut down will remain inactive, and others, perhaps, will be closed. Such only, as enjoy special advantages for production, will be able to go on, and when these propitious conditions shall cease, they too, will have to succumb to the inevitable. Only the favored few can long keep the field, these coming in and disappearing as conditions change. Left to itself, the doctrine of the survival of the fittest, must here eminently obtain.

BIG NUGGET.—The Jacksonville *Sentinel* of the 27th ult. says that on Saturday last, Martin Koster, of Foots creek, found a nugget in his claim, weighing three and a half pounds, worth about \$700. The day previous he found a piece worth over \$42, the which awakened in the mind of ye ancient miner memories of the past.

CHEAP RAILS.—An English firm has contracted to furnish 9,000 tons of steel rails for the Roman railway company, to be delivered at Leghorn at £6 10s. (about \$32.50) per ton. There is certainly no temptation for American manufacturers to compete with these terms.

Portable Valve Seat Planer.

This portable valve seat rotary planing machine, represented in the accompanying engraving, though of comparatively recent invention, has proved to be very useful in the locomotive repair shops, to engine builders and users in general. It is especially adapted to facing off the old valve seats of locomotives and other engines in a manner at once expeditious and correct. Its construction and the method of its attachment and operation are easily understood after an examination of the cut. There are two horizontal disks, the upper secured by radial arms, adjusted to suit the position of the



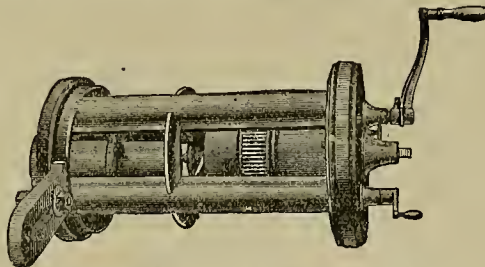
PORTABLE VALVE SEAT ROTARY PLANING MACHINE.

studs in the valve seat; the lower, carrying the cutter and its slide, revolves freely against the upper and is held in place by a king-bolt passing through its center. This lower plate is also secured by a circular gib upon its circumference, which admits of taking up the wear. It is an annular gear, having teeth cut on its inner periphery, from which it receives its rotary motion by means of its connection with the bevel gears and crank. The crank may be replaced by a pulley if power be convenient. The double bevel shaft acts like a back gear and admits of a change of speed. Either bevel is thrown into gear, at pleasure, by the movement of a pin in a slot operated by the hand-wheel. If the outer bevel is in action, it gears directly into the lower plate; if the inner bevel,

The points claimed for this tool are the great saving in time and labor over old methods; also a saving in files, and the fact that the job may be done accurately, as the plates may be set true with the unworn parts of the valve seat, and, consequently, the new face will be likewise true. It is readily seen that the work done is exactly in line with the travel of the valve stem, thereby preventing the yoke from slipping up and down the valve, as well as all extra friction on the valve stem. No more material need be removed than is absolutely necessary to true up, thus saving the seat. The work is done by a continuous cut, and the loss of time from the return motion of the ordinary planer avoided. There is also no breaking out of the edges. The saving claimed by the makers over old methods is from 75% to 80%, and 100% in

files, as none need be used. After the seat is planed the machine can be lifted off and placed on a table, which is supplied with stationary adjusting columns and chuck for holding the valve, then the valve is planed. In many instances, when the work is done in round houses, the table is essential to a more perfect and satisfactory job. It is estimated that an ordinary locomotive valve seat can be thoroughly trued up in two hours. For further information on this subject, address L. B. Flanders, manufacturer, 1025 Hamilton street, Philadelphia.

DR. LEWIS' CAMPING PARTY.—The starting of Dr. Lewis' camping party was celebrated near Melrose on Wednesday by an opening din-



IMPROVED CRANK PIN MACHINE.

ner in camp. Sixty or more tourists, who have placed themselves under Dr. Lewis' guidance, and quite a company of united guests made up a very enjoyable dinner party, and the campers started out under bright skies for their four and a half months of fresh air and exercise, sunshine and beautiful scenery. Dr. Lewis has inaugurated this new departure in camp life, in an earnest desire to bring before the public the advantages of out-door life in the mountains; and he feels convinced that the camping party's experiences of this year will enable him next year to bring 500 people from the East to enjoy a season of camp life in our mountains. The idea is a good one.

The shooting match between Carver, of California and Petty, of Omaha, resulted in favor of Carver, who broke 487 glass balls out of 500, using a rifle, while Petty broke 478 out of 500, using a shotgun.

An Old Miner and a New Process.

From Mr. R. F. L. Halleck, of Placerville, El Dorado county, we have received a letter recounting some of his experiences as a metallurgist and millman during a residence of 25 years in California. In 1853 our correspondent was working quartz in Butte county by the rude and primitive plans then in use, coarse baize and rawhides being employed to catch the gold. The mill cams, shafts and stamp stems were then made of wood; soda and potash being added to assist the mercury. About this time copper plates began to make their appearance, many other inventions of less obvious utility having soon after been introduced. Among these were diverse styles of pans, concentrators, separators, etc. Along from '55 to '58, more care and system began to be observed and better results were obtained, calcining and chloridizing being at this period resorted to. But the millmen being still without any process that would answer for working their low grade ores, this gentleman, with a view to supplying this want, got up what was known as the Halleck and Eiler process, for which he was estopped from getting a patent by parties who had anticipated his plan in some minor particulars. More recently he has devised another system for the reduction of rebellious ores, called the "Eureka process," and which, in some trials made upon Meadow lake rock, having given satisfaction, may be supposed to possess a good deal of merit. Encouraged by these experiments, works will be put up in that district the coming summer for operating on an extended scale. Should his success be commensurate with his expectations, the invention of the Eureka process will advance his professional reputation and reap a great pecuniary reward. We shall await with some interest the results of these more crucial trials of the new plan in a mining region where all other processes have heretofore so signally failed.

Improved Crank Pin Machine.

We give an engraving herewith representing a patent crank pin machine, built by L. B. Flanders, 1025 Hamilton street, Philadelphia, adapted to turning crank pins in position on a locomotive and while the wheels are under the engine. It is fastened by means of scroll and self-centering jaws at one end, to the collar of the pin, upon which there is no wear; it is then clamped in position by bolts passing through the spokes of driver. The tail stock center is then run up, and if the pin is not bent it will exactly fit in the old center holding the outer end true; if it does not come exactly central, the tool is pushed down and turned around the outer collar, showing exactly all the variation; the old center is then chipped till it does fit. The cut shows the cutter-bar and its gear driven and fed either way by the crank intermediate gearing, which gives motion to the screw. The cutter is bent and fastened by a set-screw in the extreme end of the cutter-bar, and is readily applied to the work, and fed by a nut moved by the screw as before mentioned. The boring attachment for truing up holes after being worn by a loose pin, is very quickly attached and adjusted to cut any size required.

METEOROLOGICAL SUMMARY FOR APRIL.—The report of the U. S. Signal Service officer, of San Francisco, for the month of April is summarized as follows: The mean height of barometer for the month was 29.93; mean temperature, 55.3; mean humidity, 70.4; prevailing winds, west; highest barometer, 30.215; lowest, 29.589; highest temperature, 70°; lowest, 44°; monthly range, 26; greatest velocity of wind, 28 miles per hour; total number of miles traveled by wind, 6,113; total rainfall, 1.06 inches. Rainfall in April during former years: 1872, .75 inches; 1873, .43 inches; 1874, .90 inches; 1875, .10 inches; 1876, 1.29 inches; 1877, .26 inches.

The late party of divers, under Capt. Winant, returned from the wreck of the *San Francisco* with \$16,000 in bullion, and five tons of valuable ores.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

The Bodie Mines.—No. 2.

[By the MINING AND SCIENTIFIC PRESS Correspondent.]

Some Details Concerning the General District Formation, Structure of the Veins, Character of Exploration, etc.

In the preceding edition of the PRESS, leading outlines of the history of Bodie district—its first excitement, decline and neglect, and final revival, and the occasion thereof—were given. In this article I will endeavor to convey some knowledge of the topographical and geological features of the district, and a substantial "glimpse" of the programme of exploration well advanced, with such conclusions as the prospects plainly warrant.

Possibly a word geographical may be in place. Bodie district is in Mono county, Cal., about eight miles from Aurora, Nev., in a direct line, the State line being located about midway between the two towns, whose history has been curiously linked together first and last. The traveled route to Bodie from San Francisco, is a roundabout one, but the journey is easily made in about 36 hours, by rail to Carson, thence by comfortable stage coaches, at a fare of \$36. Should the mines keep up their present interest indefinitely, the old road via the Sonora pass, from the end of the Copperopolis railroad at Milton, and being very direct to Bridgeport, Bodie and Aurora, will doubtless be repaired, and a strong line of travel and business created. In the meantime, however, the larger transportation interests involved—the Central Pacific, and Virginia and Truckee railroads—will undoubtedly extend an iron way south along the easterly base of the Sierras, which would always exert a controlling influence over all the trade and travel of the large and growing sections of Nevada and California in that direction.

The road from Aurora to Bodie, 12 miles in length, passes through a deep lava flow, in a natural gorge of wonderful interest to the beholder. The road rises in grade, until an altitude of 9,300 feet is reached at the town of Bodie, which is situated to the west of the bluff of this name, which region has an altitude of 10,000 feet, though it does not seem so high, owing to the generally high rolling country all about. Bodie bluff, however, stands out clearly defined, like an island, and the view from its crest is one of surpassing grandeur and extent, an amphitheater of snow-capped mountains, unequalled by anything in Switzerland. Down south a dozen miles at the base of the hills, is Mono lake, the so-called Dead sea of America, which adds to the scene. The climate at Bodie is variegated, there being considerable severe cold, stormy weather, as well as much that is excellent. It is healthful as well. The country is generally barren of timber in the better sense, only a good quality being attainable nearer the main Sierra belt, 20 or more miles distant. A goodly supply of fuel will be had several years yet within a few miles of Bodie. The water supply is dependent upon springs in the town and at different places adjacent to the mines, which, as yet, are comparatively dry. The town is built of lumber, and contains about 1,500 people, increasing in numbers.

Bodie district proper—the section embracing the mines—in about one by three miles in extent, the direction lengthwise being north and south. Bodie bluff terminates abruptly at the north end, Queen Bee hill is the southern, and Silver hill the intermediate eminences of interest. Going south from the high bluff, the district flattens down materially, and in the center of it is a whitish sedimentary formation, half a mile in length, sort of egg-shaped, which tends to the theory that the whole formation was at one time riven apart and afterwards filled in with this matter. Otherwise the district entire is one of the best defined, easiest understood, as to geological formation, in the history of mining. It is porphyritic and regular, the veins chiefly gold-bearing, and placed in a singularly interesting manner for the purposes of either theorizing or practical and successful exploration. As a rule, considerable debris is found over the surface of the district, creating a great number of "blind leads," but which can be readily discovered by crosscutting at no great depth. In the deeper levels these are found to carry down their original size as a rule, and all continuing to incline to a common center from either side and for the entire length of the district. It perhaps remains to be proven whether the theory is sound which concludes that there is one great mother lode at some point underneath all—the trunk of a tree, so to speak, of which the present system of ledges are only the branches. [It was the intention to illustrate this theory with a diagram, but owing to its being unfinished it will be reserved along with some sketches and maps, which are in course of preparation, for a small publication in book form at an early day.] The general width of the quartz veins is from two to three feet, but some of them are five and six, with fissures and ore chambers varying in size, from three to fifteen feet, as in the great Standard mine, which is a perfect formation as to casing and uniform quality of ore to a depth of over

800 feet and corresponding length. The weight of operations is confined to Bodie bluff as yet, on the extreme north end of which was centered the early explorations on any scale worthy of mention. There is a series of valuable veins—a score in number—almost jutting out of the abrupt north end of the bluff, all being more or less prospected by means of tunnels, shafts and crosscuts, but until the new regime operations were of a comparatively trifling and timid order, while the knowledge displayed in the reduction of these simply constructed ores was of the most imperfect kind, resulting more or less disastrously. The gold is of an exceedingly fine formation—will float in water—and the conclusion is irresistible, as compared with modern workings, that at least one-half was sluiced down stream directly from the batteries. The only thing successfully amalgamated being the magnetic iron involved. The vein matter on Bodie bluff has been hard near the surface, but at a depth of 50 or 100 feet it uniformly becomes soft, decomposed and easily mined without the use of powder, except as to the country rock. In the vicinity of Silver Hill, as at the Red Cloud, the ore carries more silver, turning to gold again at the base of Queen Bee hill, where the large and promising deposit, known as the Richer, is located. Except at the Red Cloud (250 feet) no depth of shaft has been attained outside of the main bluff, where the most systematic plan of operations is well under way, at a dozen important points. At the extreme north end, the Syndicate company are driving a main tunnel midway of the series, at a depth of 700 feet below the surface; it is in over 900 feet, and in a few months more will be in the midst of all. South of this and quite central as to location, the Standard company are sinking a shaft, exclusive of the mine proper, which will be carried to the greater depth of at least 1,500 feet, and is now down near 400 feet. The Standard, Summit and Bodie ledges dip from the east to the west, the Bechtel, McClinton and Belvidere series from the west to the east, and in the center of all is the new Standard shaft. Next to the Standard, the Bechtel is explored to the greatest depth, that of 450 feet; the Bodie, Bulwer, Belvidere, McClinton, etc., being from 250 to 300 feet. Outside of these claims (east and west) are the Black Hawk and others, doing good work. The Standard mine has in sight say 50,000 tons, that will produce over \$60 per ton, at a total cost of \$15 per ton.

In the different mines mentioned as located on the bluff there is a great quantity of ore that will produce from \$30 to \$50 per ton. The great want of the district is a good custom mill. One small one is being erected for this purpose, and the Syndicate is rejoicing, but the latter will have one of its own soon, thus adding to the want in question.

A most striking feature of the operations in Bodie is the entire absence of anything like extravagance. There is a general air of economy and good sense displayed on the part of each and every management concerned, and with such a showing it is safe to let Bodie work out its own salvation and pass on to other fields. My next letter will refer to old Esmeralda district.

J. W.

Protection of Water on Public Lands.

EDITORS PRESS:—I see in the PRESS of the 6th inst., a notice of a bill introduced by Senator Booth in Congress, concerning water rights, and which I fear, should it become a law, will prove a death blow to the mining interest of this coast, although you appear to take a different view of the matter. I wish to say here that your paper and the opinions advanced in it are highly valued by miners generally and by none more than myself. With your permission, I would like, however, to make a few remarks on this subject: "By the terms of this bill the fresh waters of all rivers and streams with a flow of more than 50,000 gallons per day, and of all lakes and ponds of more than one acre in area, upon the public lands of the United States, are reserved, granted and dedicated to and for the free and common use of the inhabitants of the State or Territory where the same are situated, for drinking, washing and the ordinary purposes of sustaining life, and the remainder, after said purposes, are reserved for irrigation and manufacturing, in their respective order, and no private property or ownership, founded upon grant, custom or otherwise, shall ever be created or allowed in such water to supersede or prevail against said common right of its inhabitants; subject, however, to such reasonable regulations as a State or Territory shall make to protect the first appropriation of water to a useful or beneficial purpose, so long as the same is actually continued against any subsequent appropriation."

Now, Mr. Editor, this language is strong and somewhat explicit. If it is not intended to immediately stop the miners from rendering these waters unfit for drinking and washing (which I believe it is), it surely is intended to have that effect some time in the future. Remember there is not any reserve, dedication or grant in this law for the benefit of the miner, except for the purpose of washing his shirts and quenching his thirst, and if one stops well down the creek and wishes to drink and wash, he can confine his neighbors above to a similar pursuit; for should one above start a hydraulic, or even a quartz mill, he will render the water useless for drinking or washing, and the drinker can

enjoin him, for no private property or ownership shall ever be allowed to prevail against this common right.

The drinking, washing, irrigating and manufacturing people in their respective order have very important rights here granted them which they have always enjoyed, while the miner is not mentioned further than to plainly tell him that he must cease to muddy the water, and for fear it should be hard to operate this law on account of vested rights, a clause is inserted to take care of the future at least.

Let us have another quotation. "Hereafter all surveys of public lands, and all grants of the same, to promote use or ownership shall be made to conform to, and provide for the reservations and dedications; and all patents made in this act, shall be made subject thereto by express terms." Now, Mr. Editor, this all must mean something, and be intended to serve some purpose. The next question is, what can that purpose be. The inhabitants of this country have always enjoyed all the above specified rights as fully as they will after Mr. Booth's bill becomes a law, unless, as I before said, it should have the effect to keep the water clear where it is now muddy. As for men posting notices merely, and holding valuable water rights, our State codes so amply provide for that as to render Mr. Booth's bill unnecessary. If Mr. Booth's bill is not intended to settle the debris question I mistake it, and if it should succeed, it will be thorough work, for it would not only stop all placer mining, but rest assured the last quartz mill is built, and few of those now in operation would continue to run, because one large mill spoils the water for drinking of a large stream and washing for many miles.

I do not suppose that there is a man in California who would wish to entirely stop the mines, but there are a great many who would stop some of them long enough to force their owners to pay an enormous price for property of small value. Permit me to give you the opinion of one long experienced in mining; and that is, that if this business is to be carried on at all, it must have a legal standing equal to that of other property and business. It is too risky to be he sustained on anything short of this. My object in writing this is more to call out discussion than to discuss. I manage a small hydraulic claim, which I am much better qualified to do than to write. I hope to see this matter discussed by abler pens than mine, and if they show that I take the wrong view of this matter, so much the better.

ANDREW JACKSON.

Washington, Plumas county, April 21st.

Salt River, Arizona.

It was long supposed that the brackishness of Salt river, Arizona, was caused by the stream running over a bed of salt somewhere along its course. Its waters are pure and fresh from where it heads in the White mountains to within 50 miles of where it empties into the Gila. Fifty miles from its junction with the Gila there comes into it a stream of water that is intensely salt. This stream pours out of the side of a large mountain, and is from 20 to 30 feet deep. It is very rapid, and pours into the Salt river a great volume of water. Here could be easily manufactured sufficient salt to supply the markets of the world. All that would be necessary would be to dig ditches and lead the brine to basins in the nearest deserts. The heat of the sun would make the salt. Were there a railroad near the stream its waters would doubtless soon be turned and led to immense evaporating ponds. It is supposed that the interior of the mountain, out of which the stream flows, is largely composed of rock salt.

A DUBIOUS ENTERPRISE.—It is stated that a stage line will be run, after July 1st, between Fort Worth, Texas, the present terminus of the Texas & Pacific railroad, and Fort Yuma, California, the present end of the Southern Pacific. The distance between these points, by an air line, is about a thousand miles, and the travelers who may undertake to cross the continent by the devious stage route, through inhospitable wilds destitute to a large degree of the ordinary comforts of life, will be pretty apt to appreciate the speed and luxury of the railway forever after. It is safe to say that few of those who crossed the plains and mountains to reach California in the days preceding the Pacific railways have the ingratitude now to abuse the remarkable men who achieved the great work of a transcontinental railway, or to grudge those who took the risks of the enterprise a liberal return for their money and toil.—*Railway Age.*

THE Murchie mine, in Nevada, California, is proving to be a bonanza. The Transcript says: A man who has worked in nearly every mine in the county, and is at present employed in the depths of the Murchie, informs us that the strike made by that company excels for extent and richness anything he has ever seen developed in this section. Where they were working yesterday the ledge had increased to the remarkable thickness of six feet. For some time it has averaged three feet, and the rock taken out is unexpectedly rich. The Murchie is rapidly stepping into the front rank of Nevada county's bonanzas.

OVER 275 quartz locations in Custer an adjoining counties, Black Hills, have been entered.

The Revelations of Science Anticipated.

We noticed in our issue of the 13th inst. that the celebrated French chemist, M. Pictet, had succeeded in reducing hydrogen gas, by the enormous pressure of 650 atmospheres, obtaining thereby both fluid and solid metallic hydrogen. The announcement of this fact reminds us that J. S. Phillips, M. E., of this city, had expressed the opinion, some eight years since, that this might and some time would be accomplished, as may be seen by reference to the initial chapter of his "Explorers' Miners' and Metallurgists' Companion," wherein the igneous formations of the earth are treated of.

Mr. Phillips therein asserted it as probable that hydrogen, under proper conditions of great pressure, would take on, both fluid and solid, metallic forms. He has been fortunate in introducing this as well as other theories, but more particularly in advancing the idea that "the valleys and plains had sunk," and that the consequent lateral pressure of the earth's crust had produced heat and plasticity, in opposition to the previous notion that mountains had been elevated. In these views he preceded Mr. Mallet, and obtained much credit at the time from the London *Mining Journal*, the *Quarterly Review*, MINING AND SCIENTIFIC PRESS and other papers.

When Mr. Phillips's work was issued, while all admitted it to be very comprehensive and valuable in its practical portions, some deemed his "theories" too speculative and not sufficiently conformable to the theories of other writers; wherefore an allusion now to these facts is the more pertinent, as they form keystones for his arguments.

From Mr. Phillips's hook we quote as follows: "All volcanoes discharge more or less steam, and it has been therefore supposed that proximity to water is a necessity for their existence, but the very rims of the oceanic basins, where they generally lie, have been and are being formed by that same compression which creates and sustains their heat, whilst the hydrogen of this water may have proceeded from the interior of the earth, where under sufficient pressure it may lie in liquid or solid state, until it is by some means removed, when it might create even the electric power, whilst the actual water—derived just like the ocean itself from this internal source—was but the product of combustion, with atmospheric oxygen at or near the orifice." * * *

"These principles of pressure and heat have not been sufficiently studied or experimented on by geologists." * * * In speaking of steam, he says: "As water possesses so many other peculiarities, may it not have the additional property of becoming again liquid, or of being reduced to hydrogen under certain pressure and heat, thereby affording the nucleus of central fuel for the formation of worlds as the pressure is removed at the proper degree of temperature and ignition or oxidation of this, thus formed metallic hydrogen ensues. It may be possible that the vapor again liquefies or solidifies, after losing all its latent heat, under sufficient pressure, and on the release of pressure the elements of hydrogen and oxygen may become free and reunite when ignited as the vapor of water." * * *

"Since the date of the first edition of this hook containing the above remarks, those astounding explosions of burning hydrogen from the sun to some 200,000 miles above its surface, prove that liquid or solid hydrogen must exist under suitable conditions in the interior of that body, and thus supply the fuel for its formation. If this is so in the sun, may it not be acting in a like manner, but with less power, in our globe, and thus create volcanic force, which by bursting occasionally under certain portions of the crust, as described in the fourth chapter, produces earthquakes, and accounts for the formation and presence of the water discharged through red-hot craters."

Additional remarks from this author might be quoted, illustrating the extent to which the results attained by this French scientist, by means of pressure, were by him anticipated.

THE GREAT FREIBURG TUNNEL.—The famous Rothschenberger water audit for draining the Freiburg mines has been completed, after a period of 30 years, and is said to be the greatest work of the kind that has ever been undertaken to aid the explorations of a mining district. This immense tunnel, as described, is ventilated by eight air shafts, and lies some 400 feet below the deepest Freiburger water audit. It has a uniform height of nearly 10 feet, with a somewhat smaller breadth, and when completed, will be, with its ramifications, 31½ miles in length. The gradient of the floor is only 0.03 m. in 100 meters. This small gradient may make it necessary to clear the tunnel occasionally, but this can be accomplished without difficulty with suitable boats and dredges. Five miles of the tunnel are perfectly straight, without a curve, and along the whole line the curves are very light. The remarkable fact also appears that nearly the whole driving of this vast tunnel, the rock throughout almost the entire length of which is solid gneiss, has been done by hand.

SPIRIT WRITING.—A New York professor explains that "spirit writing" can be produced by using sulphate of quinine as ink, the same being invisible until brought out by electric light thrown upon it through blue glass.

MECHANICAL PROGRESS.

Notes on Boiler Making.

A report has lately been made by Mr. Henry Hiller, chief engineer of an English Boiler Insurance company concerning defective boilers; and it will be interesting to boiler makers to see what the insurance examiner considers defective points. Those constructed of good material and with good workmanship, but on defective plans, may be both troublesome and dangerous in use; hence the great advantage of obtaining full and detailed specifications, founded on long experience and careful observation, previous to ordering new boilers. Large numbers of small vertical boilers are constructed of simple form, and with very limited heating surface, and are often most wasteful of fuel. The chimney tubes of many being unprotected above the water line become overheated and sometimes collapse, whilst the excessive expansion from this cause induces serious grooving and occasionally accelerates explosion. In many "Lancashire" "Cornish," and other boilers, due allowance and arrangement is not made for the unequal expansion which occurs in some degree in boilers of all constructions. In many boilers proposed, which were doubly riveted at the longitudinal seams, this riveting was badly arranged, the area of the rivets being much in excess of that of the plate between the rivet holes. In others, large flue tubes were not suitably strengthened, or the plates used were so thick as to lead to a leakage at seams or fracture in ordinary work. In some flat-ended boilers the gusset stays are not carried a sufficient distance along the shell, hence the ends often become bulged and dangerous. Gussets should be attached both to the shell and ends by double angle irons, the latter gripping the gusset plate between them. The fittings are often of inferior construction or badly arranged, which manifest the great ignorance frequently displayed in the setting of boilers, leading to their becoming dangerous through external corrosion, etc., and to great waste of fuel, through the difficulty of cleaning the flues and the plates of the boiler. I strongly recommend for high-pressure boilers that the manhole mouthpieces should be of wrought iron, with faced joints; also that the clumsy cast iron fronts for furnaces of internally-fired boilers should be entirely discarded.

BROAD CARS ON NARROW-GAUGE TRACKS.—A matter of no little practical interest to railway mechanics may be found in the result of an experiment on the Denver and Rio Grande railroad in running standard gauge car bodies on their narrow-gauge road. The Ligonier Valley railroad was the first narrow-gauge road in the country to try this experiment, but a correspondent of the *Railway Age* says they are now running broad-gauge cars over their three feet gauge with complete success. The Washington City, Virginia Midland & G. S. railroad are building a narrow-gauge branch from Ward's Springs, a station on their line, to an iron mine about 10 miles distant, and have contracted with R. H. Ramsey, of Philadelphia, for an apparatus for transferring their broad-gauge car bodies to and from their main line. Experience will demonstrate that by this means narrow-gauge roads can be made profitable which would otherwise not pay expenses. The superintendent of the Ligonier Valley railroad writes to Mr. Ramsey as follows: "I am able now after several months' experience to say that there is no difficulty in the broad-gauge car bodies running steadily on narrow-gauge tracks. We ship and transfer cars of cattle, hark, lumber and ties, etc., without any special care of adjustment of the load to the center of the car, and have not in any instance discovered the slightest tendency to sway or upset. The other day a Fort Wayne car arrived on the Pennsylvania railroad loaded with a portable saw mill (boiler, engine, etc.), to go up our road—quite a heavy and top-heavy load—yet our men transferred the car body as it stood without hesitation, and took it to Ligonier without difficulty."

AMERICAN PLANISHED IRON.—An exchange says: The greatest victory yet achieved by American patent planished sheet-iron is its use on the jackets of the 40 locomotives built by the Baldwin Locomotive Works for Russia. This iron enters into competition with the well known Russian iron for such purposes, and is in fact its only rival. That its quality is all that could be desired is strongly evidenced in this fact, for certainly such a house as the Baldwin Locomotive Works would not put it on locomotives designed for Russia unless they had been thoroughly convinced, from actual experience, that it was the equal of the Russian iron.

CLEANING OIL WELLS.—A description is furnished in a Pennsylvania paper of the latest invention for cleaning out oil wells. It is an iron ram, 37 feet long, weighing 2,100 pounds. The mode of working is to fill the well with water or oil above the sandrock, then pump out the air, and when the air is exhausted or nearly so, to drop the ram into the well. The ram will have a drop of 800 feet and a pressure of 77,000 pounds to the square inch, which will force the water or oil into the crevices of the sandrock and in this manner open up the rock and let the oil enter the well. In fact, it will have the same effect as steaming or torpedoing.

Centering and Turning.

Workers at the lathe will be interested in some remarks on centering and turning, which a veteran Ft. Wayne machinist writes for the *Railroad Gazette*. He says that in many Western shops far too little attention is paid in having the lathe centers all turned to a standard gauge and the centers countersunk to fit exactly and drilled. Some men think it does not pay to center light work any other way than with a center-punch, where they do not have cutting-off and centering machines. But this the writer thinks is a most erroneous idea. In his opinion, using punched centers with a center punch ground on the stone is a barbarous practice. No wonder the dead center is always in bad order, cutting and squeaking. The fact is, putting good centers in work is of as much importance as the foundation of a house, and every thoroughbred turner that has served an apprenticeship on the right side of 21 knows it. I have seen boys take work to the vise, he continues, drive a center punch into it, take it to the lathe, chalk the full sides, take it back to the vise, draw the centers, and try again; whereas, if they would put a square or center cutting in the spindle of the tail-block or head-stock and push a tool gently against the full side, it would come true in an instant. The main advantage of square centering is the superior quickness over all other methods. I have seen lots of light work from an inch and a quarter down centered by sticking one end into a hollow V-shaped socket live center, without putting a dog on one end or stopping the lathe at all. In almost any shop a boy for a few shillings a day could be kept constantly centering and drilling for all the light lathes, and then they would have good, permanent, properly shaped center or countersinks, and their centers would last for many months. I have seen good centers put in car axles by having the centers turned to the gauge and hardened to the proper temper by being fitted into each end of a wheel press and then pressed to five-eighths or three-fourths diameter. The centers are much harder, wear better, and are less liable to cut and squeak than if countersunk with a cutting center. I have seen hundreds of axles centered in this way, and no perceptible wear on the centers that did the pressing, although in constant use for years. Some men have a great notion of turning wrought iron dry with a very fine feed and quick speed, and then rasping into it with a file. That may do for old, dirty, sandy iron; but I contend that except for very light work a water-cut without filing is the better way and much quicker. A man that can scrape cast iron without chattering or jarring, and does not require files and sandstone, or can finish wrought iron balls, handles, ogees, fillets, bulges and hollows without the use of files has an immense advantage over one who can't.

HORIZONTAL STEAM ENGINES.—At a recent meeting of the English Society of Engineers a paper was read by Mr. W. Schonheyder on "Equalizing the Wear in Horizontal Steam Cylinders." The author, after noticing the large extent to which the horizontal engine was used at the present time in preference to the older type, the beam engine, explained that one objection to its use was the great and unequal wear of the cylinder, which was due to the weight of the piston continually rubbing backwards and forwards on it, and to the difficulty found in lubricating it efficiently, especially when the cylinder was kept hot by the now universal steam-jacket. After enumerating the evils resulting from the unequal wear of cylinders and pistons, the most important expedients for preventing it were described, and the author's reasons given why they could not fulfill their purpose in practice. The author then gave a description of his method of remedying the evil. This was stated to consist in making the piston-rod with a camber or upward bend in such a manner as that when loaded with the weight of the piston and placed in the cylinder it assumed a straight line, and transferred the weight to outside guides. Special tools are used which render the production of these rods easy and certain.

SHEET IRON FOR THE PARIS EXHIBITION.—The *Engineer* understands that some of the largest iron sheets ever made in Bristol—or, indeed, in England by a two high roll sheet mill—have recently been rolled at the works of Mr. Joseph Tinn, C. E., the Ashton Iron Rolling Mills, for Messrs. W. B. Wright & Co., Bristol Galvanized Ironworks, St. Philips, where they will be galvanized and corrugated and then sent to the Paris Exhibition. The sheets vary in size from 10 feet to 16 feet long by 30 inches to 3 feet wide, and are 24 to 27 gauge, or from one fortieth of an inch to one sixty-second of an inch in thickness. In regard to quality and finish, the sheets are very superior, and reflect great credit on Mr. Tinn's manager, Mr. John Harris.

STEEL VS. IRON RAILS.—In his last annual report, President Gowen, of the Reading (Pennsylvania) Railroad Company, makes a contribution to the discussion concerning the relative economy of iron and steel rails. He says, "Notwithstanding the enormous traffic of the company, out of 150,787 tons of rails made at the rolling mill and laid on the track since 1868 inclusive, but 25,851½ tons, or 17.1-10%, have worn out—a result that fully justifies the wisdom of adhering to good iron rails during the period when the difference in price between iron and steel was so great as it has been in all years prior to 1877."

SCIENTIFIC PROGRESS.

THE ORGANIC ORIGIN OF LIMESTONES.—According to the *Polytechnic Review*, Prof. W. C. Williamson has lately given definiteness to the long cherished belief of geologists, that the great rock masses of limestone that enter into the composition of the earth's shell had their origin in the gradual accumulation of the remains of microscopic organisms. His observations were directed to the task of studying limestones in which no trace of these organic remains were visible, and has been fortunate enough to have for a specimen a slab of rock containing a large chambered shell. Outside of this fossil the limestone slab, the evidences of the organic constitution of the rock was barely distinguishable, the relics of the microscopic shells being only faintly recognizable here and there; but within the large shell they were found in excellent preservation, the body of the latter having resisted the disintegration action of the percolating water, containing carbonic acid and other solvents, sufficient to protect the delicate remains of these microscopic organisms from the solution and disappearance which they suffered outside of it. The dense texture of most of the limestones, which frequently exhibit no trace of their organic origin, can readily be explained to result from the metamorphism which the rock masses undergo by the solvent action of meteoric water containing carbonic acid, which, in time, more or less completely disintegrates the delicate shelly relics of which they are composed, and gradually renders the whole texture of the rock homogeneous and uniform even to the microscope.

ONE OF THE HIGHEST MOUNTAINS.—According to recent geographical surveys, the *Scientific American* says it seems the Aconcagua peak is the loftiest of the Andes range, and the highest in America. It is 100 miles east of Valparaiso, and nearly in latitude 32° 30' south. Its actual height is not accurately known, but the measurements made by M. Pissis, and other noted scientists make it reasonably certain that the elevation is between 22,400 and 23,000 feet above the waters of the sea. The French explorer made it 22,422, or four miles and 1,302 feet over, which would be 998 feet higher than the snowy summit of Chimborazo, as Humboldt measured the latter, when in 1802 the great German made his famous ascent of that mountain with Bonpland to a height of 19,286 feet. Aconcagua, seen from the Chilean seaport of Valparaiso, is shown only as a peak, towering above the other heights of the Andes at a distance of 100 miles or more inland, toward the sunrise. Aconcagua has been called an extinct volcano, but the best examinations yet made of its summit do not appear to bear out the idea. The recent observations make the height of the Chilean mountain 23,200 feet, and "probably" over that figure. The elevation of Mexico's highest mountain—Popocatepetl, or "Smoking mountain"—is nearly 5,000 feet less than that of the Chilean peak, and Mount Shasta and Mount Hood fall short about the same figure. Pike's peak is about 9,000 feet lower than Aconcagua.

TRANSFORMATION OF CARTILAGE INTO BONE.—The last *Bulletin* of the Belgian Academy of Sciences (Vol. XLIV., No. 11) contains a very valuable paper of Dr. Lehoucq, Superintendent of Anatomical Researches at the University of Ghent, on the mode of formation of the bone tissue in the long bones of mammals, in which the author discusses and resolves by his researches, based on a new principle, the much debated question whether the embryonal cartilage is substituted by a new tissue, or is directly transformed into a bone. The great difficulty of rendering the minute cartilage cells apparent among other cells is resolved by the author by his employing soda, and decalcifying the sections with acidulated glycerine; the cells thus preserve their shape, and receive a beautiful color, as is seen from a chromo-lithographed plate accompanying the paper. By using this method the author was enabled to prove that the minute cartilage cells take an active part in the formation of bones, quite performing the part of osteoblasts. The researches were carried out in the Ghent Laboratory, under the direction of Prof. van Bambeke, and the paper is accompanied by a very favorable comment thereon by Prof. van Beneden.

PERPETUATION OF PHYSICAL TRAITS.—M. Lenglen, a physician of Arras, has recently described a remarkable perpetuation of physical traits. A certain M. Gamelon, in the last century, was sex-digital, having two thumbs on each hand and two great toes on each foot. The peculiarity was not noticeable in his son, but in each of the three subsequent generations it has been strongly marked, some of the children at present showing the malformation as distinctly as their great-grandfather. M. de Quatrefages has noticed, a few months since, a similar case in the animal kingdom. A six-toed cock having transmitted this peculiarity to his descendants, it has spread to such a degree that in the district where it occurred the ordinary five-toed variety is no more to be met with.

MELTING POINT OF PLATINUM AND SILVER.—J. Violle (*Comptes Rendus* 1877-85, p. 546) determined the melting point of silver to be 954° C., and that of platinum 1779° C. The latter appears rather low.

A QUARRY OF INDIAN RELICS.—A discovery that will prove of interest to antiquaries has been made in Johnston township, Providence county, R. I. The exact locality is about 100 yards north of the Killingly pike, on the Big Elm farm. Mr. H. N. Angell, of Providence, while engaged in quarrying slate at the place above indicated, found a soapstone bed between two slate ledges about six feet under ground. Carloads of pulverized stone were removed, without any suspicion that it was the debris of an ancient mine. At last the surface of the soapstone rock was reached, and this was so curiously carved as to attract the notice of the workmen, the entire surface being covered with hollows and projections. This was a rock from which the aborigines had carved soapstone dishes and utensils. The method was to cut away the stone from a circular portion till that was left as a projection, and then cut under the projection until it was detached, after which the block thus obtained was hollowed out and became a dish or bowl. The work had been done with knives and hammers of stone, the slate furnishing a sharp edge to cut, chisel and scoop out the soapstone. One of two stone hammers found weighs nearly 100 pounds, and was hollowed in the middle, probably so as to be bound by thongs to a handle. Already 150 cuttings for bowls that never were finished have been counted in the soapstone. The ledge itself had been cut down by the aboriginal workmen, in this manufacture, several feet below the original level. Large numbers of stone hammers and axes have been found by the explorers. The rock is soft, and some copper, silver, talc and asbestos are associated with the soapstone.

DETECTION OF TRICHINA.—In recent years some attention has been attracted to the *Trichina*, one of the most formidable of human parasites. It is known that this microscopical worm, encysted in pork, is therewith conveyed into the alimentary tube of man, and penetrates into the tissues of the muscles, causing intolerable pains, and even sometimes death. This year a number of cases of trichinosis have been met with among the soldiers of the German garrison of Thionville. To detect the trichina, suspected meat is often examined with the microscope, but the method of examination is rather inadequate. A Russian servant, M. Tikhomiroff, has suggested a new mode of isolating the muscular fiber. He divides the pork into small pieces, and sets it to digest for about half an hour with an equal volume of chlorate of potash, to which is added four times as much nitric acid. The muscular tissue thus treated is put into a flask with distilled water and agitated till it separates into its fibrille. These latter present, when the meat is infested with trichina, whitish fusiform swellings, observable with a lens, and in which the microscope reveals the presence of trichina.

ANALYSIS OF ADULTERATED BUTTER.—The City Chemist of Cleveland, Dr. Claassen, in a recent report on butter, adulterated by mixture with lard, gives a simple method of testing for this fraud. The suspected butter is melted, and about fifty grains of it poured into a test tube. When this is cooled to the temperature of the human hand there is to be added, mixing slowly by agitation, 120 grains pure sulphuric acid. If the butter is pure, the mixture will at once become yellow, and afterwards a bright yellowish red. If lard is present the mixture will pass from the color last named to a brownish red, brown, and brownish black. Turmeric or annatto is frequently used to color adulterated butter. To detect either of these dyes the butter should be melted and shaken with twice the quantity of alcohol. The butter having subsided, the dye, if any is present, will appear above, in solution, in the alcohol, and tint it yellow; but from pure butter no color will be extracted.

INFLUENCE OF CLIMATE ON RACE.—Attention has been called to a curious instance of climatic influence on race. In 1816, several hundred Wurtemberg families emigrated to Transcaucasia, and took up their abode in the neighborhood of Tiflis. They were remarkable for a broad, square built, fair or red hair and blue eyes. The next generation changed somewhat, and brown hair and black eyes were seen. In the third generation the type of the original colonists was hardly recognizable. Black eyes and hair were the rule, the round face lengthened, the form gained slenderness and elegance. Inasmuch as they never inter-married with another race, it is contended that climate alone must have effected the change.

ADULTERATION OF BONEASH WITH PHOSPHORITE.—We read in *Dingler's Polytechnic Journal*, that A. V. Wachtel has discovered a large amount of phosphorite in samples of boneash. As this substance dissolves so slowly that it is of very little practical value as a fertilizer, and is especially deceiving, as it would yield to ordinary chemical tests the proper amount of phosphoric acid. It can be detected by the large amount of iron present, by the fluorine, also, as well as by microscopic investigation.

THE PRODUCTION OF METALLIC FILMS BY ELECTRICITY.—A. W. Wright, *Journal of Franklin Institute*, 1877, vol. 103, p. 242, in the course of some investigations found, in discharging a powerful induction coil through a vacuum, that the metal electrodes were partly disrupted, and a fine film of the metal might be deposited of any desired thickness. He suggests the use of this method for producing transparent mirrors of the different metals for optical purposes.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

GOOD ORE.—*Ledger*, April 20: Griesback's quartz claim a few miles above Volcano is one of the richest in the country. The vein is small, as all in that section are, and a vast amount of labor is involved in taking out rock enough to amount to a crnsbng. Griesback, after months of patient toil, accumulated 130 tons of ore. This was crushed at Mace's mill, and a clean-up made last week, when \$10,000 was realized. This gives an average yield of \$77 per ton.

PHENIX.—One-half the 80 stamps are running, and all will be in the course of another week. The stamps crush on an average about one and a half tons of ore per day, the monthly yield of the mine being between \$30,000 and \$35,000, expenses about \$10,000. One hundred men are employed here, and the mine is looking extremely well.

THE SEATON mine keeps a 10-stamp mill running, the gold taken out covering expenses. Some profit would accrue but for the cost of hauling the ore two miles over a bad road. There is a talk of building a new mill near the mine.

POTOSI.—This mine, near Drytown, is looking well, and if no unforeseen bad luck intervenes, will soon step up in the first rank of our paying mines.

BUTTE.

BUTTE CREEK MINES.—*Record*, April 20: The Shepard ditch will be in Whisky flat one month from the present date. There the half of said ditch will be piped across to the east side, and run in a ditch down to Diamondville, while the other half will be ditched down the east side to, or nearly opposite the same point on Butte creek. There are now about 120 Chinamen, and 30 or 40 white men working on the ditch, and a great many more will soon be employed, and as soon as the water gets well on the hills, there will be a chance for a great many miners to work at good wages; or if they get water at reasonable rates they can work for themselves.

CALAVERAS.

MOSQUITO.—*Citizen*, April 20: Mining affairs here look encouraging. A lot of 90 tons of ore milled over \$35 per ton. The San Bruno company have out over 200 tons of ore, worth between \$30 and \$40 per ton. Their mill will be run on this and custom ore for a number of weeks. The Blue Jay have a seven-foot ledge, and 100 tons of ore on their dump. The San Joaquin mine will soon be running, and a mill be built to crush the ore. At the depth now reached the Leghorn ore fails to pay, but it is expected the ore will come in rich at greater depths.

EL DORADO.

QUARTZ MINES.—*Republican*, April 25: In a day or two the hoisting works on the Pacific mine will be started, taking the water from the old shaft and drifts at a rate that will soon drain it, after which ore extraction will commence. At the Rose mine the hoisting works have been completed, and will soon have it free from water. The machinery at the Keegan has steamed up, the shaft is being sunk, and some good ore taken out. The True mine is being worked with flattering results, and some improvements are being made on the machinery. There is much mining going on about Kelsey's.

GOLD IN THE HIGHWAY.—*Mountain Democrat*, April 27: Last Monday Hughey Roberts, while hunting a cow, saw a piece of loose quartz rock in which gold was visible. Carrying it home and breaking it up it was found to contain at least \$20 worth of gold. Some of it was in handsome specimens. This piece of rock had lain in the middle of the road, at the upper end of Placerville, for quarter of a century and been passed over many times by wagons, one of which at last broke off a small piece, exposing the gold.

RICH SPECIMENS.—Hallock is bringing up daily specimens from his claim on Big canyon thickly studded with free gold and heavy with sulphurets. The ledge promises to be a counterpart of the Hayward mine in Amador county. The facilities for extracting and working the ore are superior.

INYO.

DEFIANCE.—*Coso News*, April 20: In the drift being run to connect with the large ore body in the north works of the Defiance mine, the hard lime face has given way, and ore is now being extracted by the workmen drifting from both ends to meet one another. The connection will have been made in a few days, when ore can be extracted in sufficient amount to keep the furnaces running a long time. They will undoubtedly be started up early next month.

MOBAC.—The mine is looking well, the furnaces are to be started up soon, and there is a good prospect of a lively and profitable season for the company.

THE Kearsarge tunnel is in nearly 500 feet, heretofore all the way in solid granite, but now in quartzite or some such rock, showing such a change as to give the biggest hope of soon striking the ledge; but if not struck sooner the tunnel will be driven at least 500 feet further.

NEVADA.

THE IDAHO.—*Grass Valley Union*, April 25:

The big compressor has been started on this mine, setting the power drills again in motion. On the 10th level, several hundred feet east of the shaft, a large chamber is being excavated, in which a steam engine, to be run by compressed air, is to be stationed. From this point a large winze is to be sunk, through which the mine will hereafter be developed below the 10th level. As the ledge at the bottom is now showing larger than formerly, it is found necessary to increase the crushing capacity of the mill, and in addition to the present 35 stamps, 15 more are to be added. Another cage will also be put in the large four-compartment shaft, which will give three cage compartments. More water will be required for the mill, which renders it necessary to enlarge the company's ditch. All these improvements and enlargements are consequent upon the increased power and production of the mine, and it will take about three months before they are all completed. With the increased power the mine can be worked to the depth of 2,000 feet or more; and with 50 stamps the reduction works will be ample for all purposes during the life of the mine. More power drills will also be used in order to supply the increased number of stamps. It is California's great gold mine, having paid 104 regular dividends, amounting to over \$2,300,000.

PLACER.

LITTLE YORK.—*Dutch Flat Forum*, April 27: Hydraulic mining in the Empire and Christmas Hill mine was resumed and has been kept in steady progress since January 1st. Three thousand inches of water, forced through three giants, is brought to bear with terrific force in removing the debris from the Empire mine, and twenty men, assisted by a monster derrick, are employed in blasting and removing boulders. At the conclusion of last season's washing a heavy powder blast was exploded, which, together with the pulverizing of a large amount of the bottom gravel, caused an extensive slide of clay from the upper strata, which will take some time yet to dispose of. But one clean-up has been made, resulting very favorably. Christmas Hill is worked by a force of nine men and 700 inches of water. Two clean-ups have been made, paying good dividends as usual.

YOU BET.—Washing in the Neece & West has been in progress since January 15th, giving employment to twenty men and using 100 inches of water. So far two clean-ups have been made, resulting very satisfactorily. A blast of 700 kegs of powder was exploded the first of the week, under a 200-foot gravel bank, which proved an entire success, disintegrating a very large amount of solid gravel. Washing in the Waloopa was resumed March 5th. Nine men are employed and 450 inches of water utilized. One clean-up has been made, which is reported to have considerably exceeded the expectations of the company. A good clean-up has been made at the Red Dog mine, also at the Yuba, lately purchased from Alvinza Hayward.

HAYWARD MINES.—Hydraulic mining in Wilcox Ravine, Chicken Point and the Tunnel mine has been in progress since January 1st. Six men are employed in the Wilcox Ravine, and 750 inches of water utilized. Three clean-ups have been made, resulting very satisfactorily. Ten men are employed and 400 inches of water used at Chicken Point. Two clean-ups this season are reported to have done splendidly. The Tunnel mine for some time did not wash steadily, but is now being made to boom, with 1,000 inches of water and seven men. No general clean-up has been made for the season.

PLUMAS.

TWELVE-MILE BAR.—*National*, April 20: The Hallsted claim, at Kingsbury, has been running most of the winter, and enough ground is now stripped to keep them busy, with a good head of water for a year, cleaning up. They work four men, and have made two "clean-ups," both from side-flumes and entirely from top dirt, one to the amount \$450 and the other about \$875. They have got a cut through the bedrock low enough to bottom up, and will commence on the bedrock, being certain that they will get some big pay. The Brooks claim, on Rush Creek flat, is in full blast, running two giants and six men. They have partially cleaned up twice, with good results. They will have a good head of water all the season, and cannot fail to make money. Cap. Corser is piping in good gravel in his claim on Rich gulch; has a liberal head of water, and will do well. Fred. Lewis, whose claim is on the head of the gulch, has an extraordinary head of water, considering the location, and is working some very rich ground. He will make more this year than he has in the past three seasons. Hide is piping in his claims on 12-mile bar, working three men and getting good results. Dean, Kavanaugh and Burge are at work on Soda Creek, but with what success is not known.

SHASTA.

MINING ITEMS.—*Reading Independent*, April 25: Rob. Harvey is pushing the mining business energetically in the Hardscrabble. M. H. Peck has got his machinery on the ground, and a force of men now putting up his new quartz mill on South Fork near the Chicago mill. The Dover gold and mining company have made a partial clean-up, with highly satisfactory results. In the Buckeye mining district the water is getting low and cleaning up is the order of business just now. Wm. Saffroy cleaned up \$238.40, the result of one week's run, and the week previous he averaged \$33 a day. This is good, considering that he has but one man to help him. Dave Fugua would have done splendid this winter had he not had

the misfortune to lose about \$30,000 by the breaking of his reservoir. At Churntown the miners are bringing in considerable dust.

TRINITY.

COARSE GOLD.—*Journal*, April 20: We were this week shown \$900 in gold dust taken from the claim of Soudan Bros. on West Weaver creek. With the exception of a small quantity, the whole amount was in pieces of from \$1 to \$10 in value, many of them ranging from \$5 to \$10, and the quality was above the average of the gold dust taken out in this county, all of which is good. The amount was the result of a partial clean-up in the claim, the proprietors of which say they are well satisfied with the result, and hope for larger returns when the final and complete clean-up is made.

COAL AND IRON.—Dr. P. W. Fonda has examined the coal deposit at Cox's bar, and pronounced it a well defined mine, and the coal of superior quality. He says it is far ahead of the Seattle and Coos Bay coal—containing fully 66% of carbon, and only a small percentage of ashes and water. Were it situated any place near the line of railroad, the Doctor says, \$200,000 would be a small price for the mine. As it is, the large coal deposit at Cox's bar is valueless. Dr. Fonda further states, that alongside of the coal is a beautiful vein of chrome iron, and that if smelting works were erected in that locality, pig iron could be manufactured at a very low cost.

Nevada.

WASHOE DISTRICT.

CON. VIRGINIA.—*Gold Hill News*, May 1: The Consolidated shaft will be shut down on Saturday next for repairs. These repairs will require nearly 60 days' time, as there is 600 feet of the main shaft in a very bad condition, and but a limited force of men can be employed in the prosecution of the work. During that time from 300 to 400 tons of ore per day will be hoisted through the Ophir and C. & C. shaft, so that the production of the mine will be at least sufficient to pay all the running expenses and a regular monthly dividend of \$1 per share on the stock. A large portion of the men now at work will be retained to do dead work, in opening the ore bodies, running prospecting drifts, and making necessary air connections, preparatory to work of the most active character when the repairs are completed. The usual amount of ore has been taken out during the past week, and the ore etopes from the 1300 down to the 1750 level are yielding good ore and are showing finely.

CALIFORNIA.—On the 1950 level the east drift from the bottom of No. 3 winze is steadily advancing at the rate of four feet every day, the face in dry vein matter. The joint Ophir winze on the northern boundary line below the 1840 level, will connect with the nraise from the 1900 level to-morrow or the day after. The east crosscut on the 1750 level is making good progress. Preparations are being made to sink a winze from this drift downward to the 1840 level for air purposes. On the 1650 level a good circulation of air has been secured and the north drift again started up. The south drift on the 1600 level continues to advance in low-grade ore.

OPHIR.—During the first part of the week a vein of fine ore came in on the west side of the shaft two feet thick, following which was a broken formation of quartz and porphyry, which on last evening had again given place to ore of a good quality. This ore like the small vein recently encountered in this winze, has nearly a perpendicular strike and adds considerably to the expectations of the ore vein below where it was struck. The winze and nraise from the 1700 to the 1900 levels on the California line will complete a connection to-morrow or the day following.

SAVAGE.—The lateral drifts on the west side of the ore vein on the 1640 level are each advancing and have now attained a united length of 60 feet. Both are in porphyry and afford nothing of interest. These drifts are each to be run a distance of 75 or 100 feet north and south, when crosscuts will be made to test the extent of the ore. The face of the east crosscut on the 2000 level is still in a fine, favorable make of vein matter.

BELCHER.—The south drift on the 2160 level is steadily advancing, the face still in a good character of quartz and vein matter.

JUSTICE.—The ore etopes show well on the 800 level, and the grade of the ore extracted and crushed is showing a steady improvement. The east cross drift on the 1300 level is very hot, and the progress necessarily slow. A drift has also been started northward on this level.

SIERRA NEVADA.—The 2000 station in the south double incline winze has been opened and two drifts started, one north and the other east to prospect the ore vein.

OVERMAN.—The main shaft will reach the 1600 level by Saturday next. As soon as that depth is reached a station will be opened and the shaft be sunk a few feet further, in order to give room for making a large excavation in the shape of a drift for the reception of whatever flow of water may be struck. The east drift on the 1100 level is developing a splendid body of quartz and some low grade ore.

YELLOW JACKET.—The connecting drift with the Crown Point, on the 2000 level, has been thoroughly timbered, a good track laid for the cars and boxes are now being put in to carry the water through to the Belcher shaft. Preparations are also being made to hoist the rock through the Crown Point shaft. The new shaft is now down 1,400 feet.

BEST & BELCHER.—The joint winze on the

south line of the Con. Virginia reached a depth of 1,900 feet at noon to-day, the bottom still in porphyry, carrying streaks of fine looking quartz.

HALE & NORCROSS.—Everything is now in the best of shape, and the pumps, working in conjunction with those of the Savage, are gaining rapidly on the water in the shaft.

CHOLLAR-COMBINATION SHAFT.—The rock in the bottom is somewhat softer and the flow of water quite strong, averaging about 36,500 gallons per day.

JULIA CON.—The south drift on the 2000 level is steadily advancing at the rate of eight feet per day, the face in porphyry and quartz mixed. No crosscut in the ore vein has yet been started.

BULLION.—The east drift on the 1840 level is being pushed ahead, the face in favorable vein matter, carrying some very encouraging quartz. It is believed that this drift will, in a very short time, reach the main ore vein, when hopes are entertained that paying ore will be developed.

CROWN POINT.—Sinking the winze below the 2000 level is making good progress. It has now reached the 2300 level, where a station will be opened immediately and a drift started southward to connect with the Belcher line on that level.

GOULD & CURRY.—But slow progress has been made during the week in draining and repairing the drifts on the 1900 level.

ALTA.—A strong flow of water was struck during the first part of the week on the 1350 level which has prevented any further prospecting at that point.

LADY WASHINGTON.—The north drift on the 1000 level is steadily advancing, following the west wall of the ore vein, cutting occasional spots of good quartz.

SILVER HILL.—There are no changes to report of any of the prospecting drifts on the 800 level. The east drift on the 900 level is steadily advancing, the face in very lively vein matter.

SENATOR.—The Sutor tunnel has now nearly reached the western boundary of the mine, opening it to a depth of over 1600 feet below the surface.

MEXICAN.—The joint east crosscut on the Union Consolidated line is now in a distance of 280 feet, the face in hard porphyry.

EUREKA DISTRICT.

RICHMOND CON.—*Sentinel*, April 24: Several important improvements, of an economical nature have been made here during the past week. The refinery boilers are undergoing extensive repairs, new flues and plates being put in, and as soon as completed they will be ready for any emergency that may arise. It is a busy scene in and around the works, but everything moves with the system and regularity of clock work. Three calcining pans, and four crystallizers are in operation at the refinery. All of the April output of crude bullion at the works is stacked up in the yard awaiting refining.

EUREKA CON. Co., have since last September, disbursed to their fortunate shareholders, \$1,200,000 in dividends, or \$24 per share. Pretty good showing that for a mine whose shares were selling for \$12 one year ago. The late storms insure Eureka an abundant water supply during the season.

ORE PLENTY.—The large amount of ore in sight at the Hamburg mine justifies the statement that when the company's furnaces start up it will be for a long and profitable run.

ORE SHIPMENTS.—The ore shipments to Salt Lake are quite large in volume, and are becoming a regular article of freight. There is probability of there being considerable competition among Utah buyers for our high grade ores.

CHARCOAL.—The daily receipts of charcoal for the past month has averaged 12,000 bushels. The largest portion of this has been received by rail.

PARADISE DISTRICT.

ANOTHER GOOD FIND.—*Silver State*, April 26: Another new mine, said to be the richest yet discovered in the district, was found last Sunday by a man named Jackson. The new find is situated about two miles from the Big Prize, and the ore is said to bear such a resemblance to that found near the surface in the Grand Prize that experts cannot tell one from the other.

Arizona.

THE WANA WHATA.—*Citizen*, April 19: Work on tunnel pushed night and day with all the men that can be advantageously employed. The ore assays up into the thousands, a good deal being now on the dump. A five-stamp mill is in course of erection for concentrating the ore, also a furnace for reducing the concentrations into bullion. Several other mines in the vicinity are being opened with excellent prospects.

GLOBE.—The principal mines on the quartzite hill are the Silver Era, Etna, Webster, Mountain View, Julian, Chloride, Jackson, McNelly, Silver Prince and Fan, yielding ore ranging by assay from \$100 to \$5,000 per ton. Messrs. Watson & Milner have shipped 16 tons of ore from the Era and Etna to the mill of Tidwell & Co., at McMillen's camp, for reduction; the ore from the Era so far is yielding about \$1,000 per ton, and that from the Etna about \$300; the ore works to over 90% of assay. The Miami mill has shut down, they having no water, but are sinking and drifting for it, and will soon be able to start up again. The ore worked cleaned up about \$80 per ton. Nothing is being done on the Byron and Bixby mines.

STONEWALL.—Over six tons of the richest ore

ever shipped from the Territory, is at Collingwood & Co.'s awaiting re-shipment to Yuma. Since the middle of September, more than 16 tons of this character of ore has been shipped from the mine, the average yield of which is something over \$8,000 per ton. In addition to the native silver ores shipped to San Francisco, the company have crushed at the mine more than 50 tons of ore, which has paid much of the expenses of the mine. The present shipment is the largest and richest ever made, and as it comes from the lowest workings on the mine, argues well for the continuation of the rich vein, which has already yielded the original cost of the mine. The mine has kept from 30 to 40 miners employed all the time, and the Secretary informs us that they have paid out nearly \$30,000 in mining, buildings and improvements. The last accounts are that a rich stratum of chloride ore has been discovered, which promises well for the future. Already several hundred pounds of ore have been extracted from this vein, most of which is rich in chlorides and sulphurets.

Colorado.

BOULDER NEWS.—*Denver Tribune*, April 24: There are to be two new reduction works erected in this county during the coming summer. Mr. Pomeroy also contemplates adding some kind of works to his concentrating mill at Ward. The Ni Wot company's mine and mill at Ward were sold at a master's sale last week, and bought by Mr. W. A. Davidson for a little more than \$3,000. The mill alone cost over \$200,000, and the whole property was stocked for \$1,000,000. There is no redemption under the sale.

GEORGETOWN.—A spring opens the old prospectors and miners begin to look around for outcrops for a summer's prospecting tour. Glowing accounts come to us from our mines.

BOULDER.—*Denver Tribune*, April 17: With the advent of pleasant weather things are getting more lively. The Black Cloud and the Atchison mills are running. The Everett will soon start up. The two concentration mills in Telluride are also at work when suitable ores are obtained, which is not all the time. Lode mining goes on briskly, and there is a fair output of marketable ores. Gulch mining is again occupying the attention of claim owners, several of whom have gone to work during the past week.

Idaho.

GAMBRINUS DISTRICT.—*World*, April 19: The proprietors of the Forest King mine have run their east drift twenty-five feet, and the ledge looks well. They will continue on till the pay gives out. As soon as a ear can be procured the west drift will be commenced, which will be in a few days. They already have a large quantity of first-class ore on the dump. Jerome Beardsley is opening up a mine on the new road, with good prospects. New hoisting works have lately been erected, and things have a business look. Messrs. Leighty, Tuck and Brown are opening up their new mine in earnest, washing the surface off for the purpose of gathering up the float rock, while the water lasts. Messrs. Patsy Marley and Chris Wilkie have a genuine bonanza. Their mine prospects as well as any in that section. It contains very coarse gold. The boys are running a tunnel, which will be 125 feet long, to tap it 100 feet in depth. The late rich strikes in the district have encouraged a large number of the boys to sally out on the prospect, and we estimate at least 75% more rock will be milled this season than last.

DRIFTING CLAIM.—Kean and Hall, who employ 23 men, have a large quantity of dirt extracted from their drift claim. That taken out this winter is better than any heretofore reached. The pillars left prospect well and will keep the company at work for four or five years, when the main tunnel will be pushed ahead and operations changed to the south side. The dirt on the dump will be washed up in five or six weeks, when a clean-up of \$10,000 or \$12,000 is expected.

Dakota.

BLACK HILLS.

GAYVILLE.—*Times*, April 13: Forbes & Co.'s mill started yesterday and so far proves a wonderful success, as far as crushing is concerned. The capacity of one of the crushers is 24 tons in 24 hours. Three more crushers will be added as soon as they can be delivered here. Ground for a foundry has been bought to-day for Forbes' mill on No. 2 claim above discovery.

RICH STRIKES.—Some very rich rock is being taken from the Whitewood mine at Elizabeth town. There is 600 tons of ore on the dump of the Floreman mine that will average \$100 to the ton.

MINE NOTES.—There has been a stampede from Deadwood for Bear Lodge mountain. There is a reported discovery of a six foot vein of coal within 10 miles of Deadwood. A 20-stamp quartz mill will be running at Potato gulch about the first of May. The assessments in Lawrence county for this year amounts to \$2,000,000 valuation. The springs at Oil City have been running freely during the late warm weather, and it is thought they would yield at a profitable rate if they were properly opened up. One hundred and eight tons of ore from the Rhoderick Dhu lode, crushed at Cunningham & Dorringer's mill, yielded over \$10 to the ton.

The Sunshine mine at Central is looking way up. An assay of this ore was made yesterday and the owners immediately afterwards

raised a couple of hundred thousand dollars on their former price for the property. The lead is lying parallel with the Alpha mine, and it is thought will turn out as rich as any on "the belt."

Montana.

SUN RIVER.—*Madisonian*, April 13: The striking of what is supposed to be the channel of an old river has caused some excitement here, many claims having been staked off and some prospecting holes sunk. Some fair but not very rich dirt has been found. Mining operations are rather quiet at present about Bannock, but will brisk up again in a few weeks, in both placers and quartz.

BUTTE.—The Alice company are shipping bullion—from \$15,000 to \$20,000 per week. The Walker Bros. mill has shut down for repairs. One man, employed during the winter in the Mount Pleasant mine, has taken out \$7,000 worth of ore.

Oregon.

GRAVEL WASHING.—*Sentinel*, April 24: Frank Ednis is making the dirt fly at the Sterling mines. Everything is working finely now and no trouble is experienced with the ditch. Wm. Bybee made a partial clean-up at the Taylor diggings last week, and realized \$600 from two boxes.

BURNT RIVER.—The miners here working in the placer diggings are generally doing well, all making moderate, and some of them large wages. The prospects of the camp are as good as any in eastern Oregon, the mines not being deep or rocky, with water until late in the summer. One or two small quartz mills are also running.

Utah.

FRISCO MINES.—*Salt Lake Tribune*, April 25: North Star, where work has been continually prosecuted, has struck a body of high grade galena and silver ore. It shows six feet in the lower works and keeps improving as development progresses. The Wisconsin in the same district, has struck a body of ore, of which about thirty tons have been worked at the Frisco smelter, sampling about \$225 per ton in silver. The ore carries but little lead. The Bonanza is still improving, and the ore body is without end. Both smelters are kept running on their rich horn silver. The Shautie smelter will again start up, causing the working of the mines in the surrounding districts as well as in Star. The Bonanza company's smelter continues to run, and is rolling out its usual amount of bullion. Quite a lot of bullion is on the dump, and considerable is shipped daily. The Frisco smelter has been running without interruption this month on the Bonanza ore, turning out about eight tons of bullion every twenty-four hours. They have a large amount of bullion on their dump. Bullion shipments for the last month were, by the Bonanza and Frisco smelters: 24 car loads, averaging 150 ounces in silver per ton, making about \$36,000. The amount remaining on the dumps on April 1st was about 18 car-loads, averaging 176 ounces, making \$30,680. The Germania reduction works about to be erected by Chris Herreck & Sparoubold (leaching) have struck water at a depth of fifteen feet, and are continuing to sink. They expect to be in running order about the 1st of May.

THE JENNY POWERS.—*Salt Lake Tribune*, April 19: A large and rich body of ore has been developed in this mine, Park City. The vein matter is similar to that found in the Ontario at a like depth.

The Crimson Mammoth company have recently made several very big strikes, and the owners are contemplating the erection of a 40-stamp mill.

BINGHAM.—A good deal of ore has accumulated on the dumps, yet but little, owing to the bad weather, has been reduced or marketed. Much attention is being paid to the leaching process here, which seems adapted to many of the ores. Some of the ores are rich and some poor, being both gold and silver bearing.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

ORIENTAL M. Co.—April 18th. Location, Arizona. Capital stock, \$2,500,000. Directors—August F. Kantz, S. Wilhelm, F. A. Whitney, W. L. Newlands, James Newlands, J. Y. Plume.

BEAR BUTTE CON. M. Co.—April 18th. Capital stock, \$10,000,000. Directors—A. Hildebrand, J. H. O'Brien, H. H. Barling, H. E. McBride, J. Van Orden.

ST. GEORGE G. M. Co.—April 18th. Capital stock, \$2,000,000. Directors—A. W. Rose, Jr., S. Heydenfeldt, Charles E. Scott, Geo. W. Dodge, W. Hussey.

ANDIE G. & S. M. Co.—April 25th. Capital stock, \$10,000,000. Directors—C. H. Leavitt, Frank Coy, J. W. Holmes, C. J. Platt and Joseph Leggett.

COCOS ISLAND MINERAL, METALS AND MINING Co.—April 25th. Capital stock, \$3,000,000. Directors—Wm. Cooper, B. J. Hull, P. S. Hibberd, John Dryner and W. G. Schofield.

WILLIAM RUBY S. M. Co.—April 25th. Capital stock, \$10,000,000. Directors—G. H. Willard, Edwin Lewis, E. O. F. Hastings, Charles Kaufman and R. N. Van Brant.

News in Brief.

THERE were 93 deaths in San Francisco last week.

THE Pope will not quit the Vatican during this summer.

ABOUT 20 persons were killed in Texas by the recent Indian raid.

THE communists of Chicago are said to be buying arms in New York.

THE Wenban mine, Cortez district, Nevada, is turning out bullion at the rate of \$12,000 per day.

A RICH ore discovery is reported to have been made at Yankee Blade, three miles from Austin, Nevada.

NEARLY all the peaches in Siskiyou county were killed by the frosts and cold weather of last week.

THE International Telegraphic Congress, announced for July next in London, has been postponed for one year.

At a fire in Coburg, Ontario, lately, a wall fell in, burying a number of firemen in the ruins, four of whom were killed.

THE conditions imposed on Nicaragua by the German Government have all been scrupulously fulfilled.

REPORTS from the grain-growing districts of Oregon indicate an unusually large crop this season.

THE Pacific coast delegation in Congress are unanimous in opposition to the proposed revival of the Presidential contest.

THREE distinct shocks of earthquake were felt at Glendale, on the Yellowstone river, on the 15th ult.

GEORGE V. COLLINS, foreman of the Alta mine, Washoe, fell 300 feet in a shaft, and was dashed to fragments.

It is reported that Secretary Sherman is about calling in for redemption 10,000,000 of the five-twenty six per cent. bonds.

MOST foreigners who go to Guatemala remain there, never being able to earn money enough to get away.

CONGRESSMAN VANCE, of Ohio, has reached his home from San Francisco, and is now thought to be insane.

GERMANY, with a view to increasing her revenues, will tax home-grown tobacco, to the culture of which some 75,000 acres are devoted.

THE *Tribune* says the Hon. Beverly Douglas habitually goes into the House of Representatives armed as well as drunk.

ENGLAND has a good standing army. "And the stiller it stands," says the Czar, "the better it will be for it."

THE sales in the San Francisco Board, for the week ending April 23d aggregated \$1,780,000.

THE schooner *General Miller*, is undergoing refitting, and will be ready for sea about May 12th, when she will sail on a fishing voyage.

THE American section of the Paris Exhibition is filling rapidly, and it is thought it will be little, if any, behind the others on the opening day, May 1st.

HANS JENSEN, a Dane, committed suicide at San Diego, by shooting himself through the head. He was a laboring man, 40 years of age and much respected.

THE cherry crop is likely to be large. The first box of the season reached San Francisco on the 18th, of April. It came from Briggs' orchard near Marysville.

WALTER YOUNG, barkeeper, was garroted a few nights since on the corner of Van Ness avenue and Jackson street, and brutally beaten because he carried no money.

JOHN GAMAGE both shot and stabbed A. J. Le Breton, a lawyer, in San Francisco last week. The wounds are serious. Le Breton is accused of shamefully abusing the confidence of the sister of Gamage.

THE Workmen of Gilroy have adopted resolutions opposing the formation of military companies or vigilance committees for political purposes, and condemning the use of incendiary or communistic language.

THREE THOUSAND miners have met at Uddington, Scotland, and resolved to demand an advance of a shilling per day from the masters of all Scotch collieries, and if refused, to strike work on the 2d of May.

THE stamp of the Union Boot and Shoemakers is being distributed to retail dealers, who before receiving it are required to execute a bond in the sum of \$2,000 that the stamp would be used on none but goods manufactured wholly by white labor.

WM. H. VANDERBILT has gone to Europe. Many rumors are in circulation as to the object of his visit abroad, one being that he proposes to arrange for a new steamship line to be run in alliance with the Central road. Mr. Vanderbilt, however, says that his trip is one of recreation.

THE gross earnings of the Central Pacific railroad for the first three months of the year were \$3,323,400, against \$3,361,200 in the corresponding period last year. It is almost certain that the earnings this year will be greater than in 1877.

ALL of the wheat vessels which sailed hence prior to January 1st have arrived out with the exception of three, none of which are fully due. There are now 40 vessels en route from California to England with wheat.

WORK has been actively resumed on the Sheba mine, in Humboldt county, Nevada, and on which very little had been done for many years. Some 12 or 14 years ago a large quantity of extremely rich ore was taken from this mine, the ore body finally giving out, or being lost through a "fault" in the ledge.

THE talked-of fusion of the Republican and Democratic parties for choosing delegates to the Constitutional Convention is likely to prove a failure.

A BILL has been introduced in the Ohio Legislature providing for the abolition of high schools and of instruction in languages in the lower grades.

THE reading room for young women, started in this city under the auspices of the Young Women's Christian Association, is a marked success.

THE rainfall for the season has been, at Grass Valley, Nevada county, 52 inches; in the more northwesterly parts of the State from 60 to 95 inches have fallen.

JOHN RUNK was hanged in this city on Friday of last week. The knot was arranged in such a hanging manner that his neck failed to be broken, and he died from strangulation.

THE Secretary of the Treasury directs that all medical officers of marine hospital service make use of the metric system of weights and measures.

THE prize fight between Joe Hearn and Tom Haverly, occurred in a barn in Brooklyn, N. Y. The latter was beaten and probably fatally injured.

A WOMAN caught the high French heels of her shoes in a railroad track near Meriden, Minn., and was held fast while a train cut off her legs. Moral: Railroads should be abolished.

JUNCE PENNIE has decided that unless a copy of the act which gives landlords a lien on the baggage of their guests for rent due is posted on the doors of their rooms they cannot legally seize anything.

As a means of settling the Mormon question, it has been suggested that Utah be annexed to Nevada—a plan that might prove effectual if that State would consent to such an enlargement of her boundaries as would take in her polygamous neighbor.

It is proposed, by a company formed for the purpose, to build extensive floating sea baths at North Beach, the house to have the form of a flatboat, 340 feet by 100, the establishment to be fitted up in the best style throughout.

SILVER REEF.—Concerning this town the business center of an extensive and flourishing mining district in southwestern Utah, a correspondent of *Pioche Record* writes as follows: Silver Reef is pleasantly situated, with a stream of good mountain water flowing through it. Bonanza City is the next town of size and consequence in the district. It is about a quarter of a mile from Silver Reef. There are five quartz mills running in this district, and all are doing the best of work. Two of these mills—the Christy, superintended by Captain Lubbock, and the Barbee mill—are in Silver Reef. The last named mill is within fifty feet of the mine which ore it crushes. The Leeds Company's mill and mine are situated about one and a half miles from Silver Reef, and at present is the "boss" mine of the district. The mill is located about a quarter of a mile from the mine. The Riverside mill, a 10-stamper, is situated about six miles from here, on the banks of the Rio Virgin, and is run by water power, thus making a great saving in fuel. There are quite a number of leachers in operation in this district, and I believe the process is a success, as the ore is sandstone and easy to crush. This district has, according to the best of information, about 1,000 inhabitants, and I believe fully 800 of them are from Pioche and vicinity.

TURKISH DISREGARD OF THE LAWS OF HEALTH.—It is a mystery that the inhabitants of the Ottoman Empire did not all perish years ago from pulmonary diseases. Their feet are first swathed in a coarse rag, which is then wound round the lower part of the leg and bound tightly with twine; on the rag is tied a piece of sole leather hammered into a rudely-shaped sandal, with the sides rising one inch up the sides of the foot; holes are cut in the upper edges of the sandals and strings tied in them, and then fastened over the top of the foot. It is evident that their feet are wet the moment they step into mud or water over an inch in depth. This they are doing constantly in bad weather; consequently, their feet are soaking wet for a week at a stretch, and yet they live and multiply. They violate every known law of hygiene in the ventilation and often in the cleanliness of their dwellings, and yet their children are generally sturdy-looking, and the adults show fair average physique. They sleep in rows on a mat laid on the floor of their underground huts. Sometimes the floor is covered with them, and yet they do not appear to suffer for want of oxygen.

Signal Service Meteorological Report.

Week Ending April 30, 1878.

HIGHEST AND LOWEST BAROMETERS.						
Apr. 24	Apr. 25	Apr. 26	Apr. 27	Apr. 28	Apr. 29	Apr. 30
30.07	30.12	30.15	30.21	30.21	30.09	29.91
30.02	30.05	30.11	30.11	30.13	29.92	29.88
MINIMUM AND MAXIMUM THERMOMETER.						
50	55	60	64	64	67	68
50	47	48	53	55	52	52
MEAN DAILY HUMIDITY.						
03	70	68	79	82	70	70
PREVAILING WIND.						
W	W	W	SW	W	W	SW
WIND—MILES TRAVELED.						
214	373	224	116	128	170	187
STATE OF WEATHER.						
Fair.	Fair.	Fair.	Cloudy	Fair.	Clear.	Clear.
RAINFALL IN TWENTY-FOUR HOURS.						
Total rain during the season, from July 1, 1877, 85.11 in.						

Total rain during the season, from July 1, 1877, 85.11 in.

THE ENGINEER.

Railways of the World.

Messrs. A. Chaux & Cie., of Paris, have published the following approximate statement of the railway lines open throughout the world in 1876, which we glean from *Iron*. In Europe the number of miles open was:

	Miles.		Miles.
Austria.....	10,768	Italy.....	4,767
Belgium.....	2,169	Portugal.....	591
Denmark.....	781	Roumania.....	764
France.....	13,390	Russia.....	12,121
Germany.....	17,333	Sweden and Norway.....	2,769
Great Britain.....	16,659	Switzerland.....	1,200
Greece.....	7	Turkey (in Europe).....	1,200
Holland.....	1,174		
Total.....			89,129

In Asia as follows:

Caucasus.....	622	Japan.....	38
Ceylon.....	82	Java.....	102
India.....	6,475	Turkey (in Asia).....	249
Total.....			7,628

In Africa as follows:

Algeria.....	383	Mauritius.....	66
Cape of Good Hope.....	65	Natal.....	2
Egypt.....	947	Tunis.....	37
Total.....			1,450

In North America, Central America and West Indies, as follows:

Canada.....	4,697	Jamaica.....	27
Costa Rica.....	29	Mexico.....	38
Cuba.....	397	United States.....	73,508
Honduras.....	60		
Total.....			78,166

In South America, as follows:

Argentina Republic.....	982	Paraguay.....	45
Bolivia.....	59	Peru.....	960
Brazil.....	830	Uruguay.....	189
Chile.....	614	Venezuela.....	8
Colombia.....	66		
Total.....			3,753

In Australasia, as follows:

New South Wales.....	405	Tasmania.....	45
New Zealand.....	238	Victoria.....	562
Queensland.....	263	West Australia.....	40
South Australia.....	196		
Total.....			1,748

Aggregate total, 181,864 miles of railway open.

The miles of railway for every 100,000 people in the respective countries is reduced by the following tabulation.

United States.....	163	Sweden and Norway.....	24
Canada.....	139	Denmark.....	24
Uruguay.....	109	Paraguay.....	23
Costa Rica.....	70	Spain.....	21
Argentina Republic.....	64	Brazil.....	18
Great Britain.....	50	Honduras.....	17
Chile.....	49	Italy.....	16
Belgium.....	41	Russia.....	14
Switzerland.....	33	Mexico.....	6
Germany.....	32	Jamaica.....	5
Peru.....	32	Bolivia.....	4
France.....	31	Colombia.....	2
Cuba.....	28	Venezuela.....	2

MAKING BERLIN A SEAPORT.—Dr. Strousberg, the great German railway contractor, proposes to make Berlin a seaport by connecting it with the Baltic and German oceans. There is everything in the nature and configuration of the soil to assist the rapid and effectual construction of deep sea canals between Berlin and the mouth of the Elbe, and between Berlin and the mouth of the Oder. There are only a few locks needed to regulate the influx of insignificant tributaries. What is more important, the scheme, according to the calculations added, promises to be profitable enough to encourage its originator to offer to carry it through without any assistance or guarantee on the part of the government. If only half the ordinary number of vessels plying between the North sea and the Baltic prefer the towage way through the canal, the capital, fixed at about £8,000,000 sterling, will, it is stated, bear an interest of 10%. Considering the immense importance of the scheme from a military, political, commercial, and industrial point of view, it is certain to attract attention. If the plan could be realized, Berlin would be raised to the position of a dominant commercial, manufacturing and military center of the continent.

THE ROUTE VIA THE MISSISSIPPI.—The movement of grain down the Mississippi and thence, through the jetties, to Europe, has assumed some importance, and a very considerable part of the grain shipped by rail from Kansas and Nebraska has gone to St. Louis with the Southern route in view. Whither this route will be practicable in summer and in winter, and whether vessels sailing from New Orleans can secure return cargoes so as to make their trips profitable are questions soon to be settled by actual experience. The feasibility of the movement certainly is likely to be thoroughly tested. The Illinois Central Railroad Company is also making a strong effort to divert a portion of the grain trade to New Orleans, and it is understood offers the same rate to that point as is charged to New York, and has made an arrangement with a steamship line for freightage to Liverpool at the same rate from New Orleans as from New York.

IMPROVING THE MISSISSIPPI.—Under the River and Harbor bill now pending before Congress, the Mississippi river above the mouth of the Ohio gets \$964,500. The Missouri river is given a special appropriation of \$275,000; of this \$80,000 is for surveys. It is thought these amounts will be granted, and work will be commenced during the coming season.

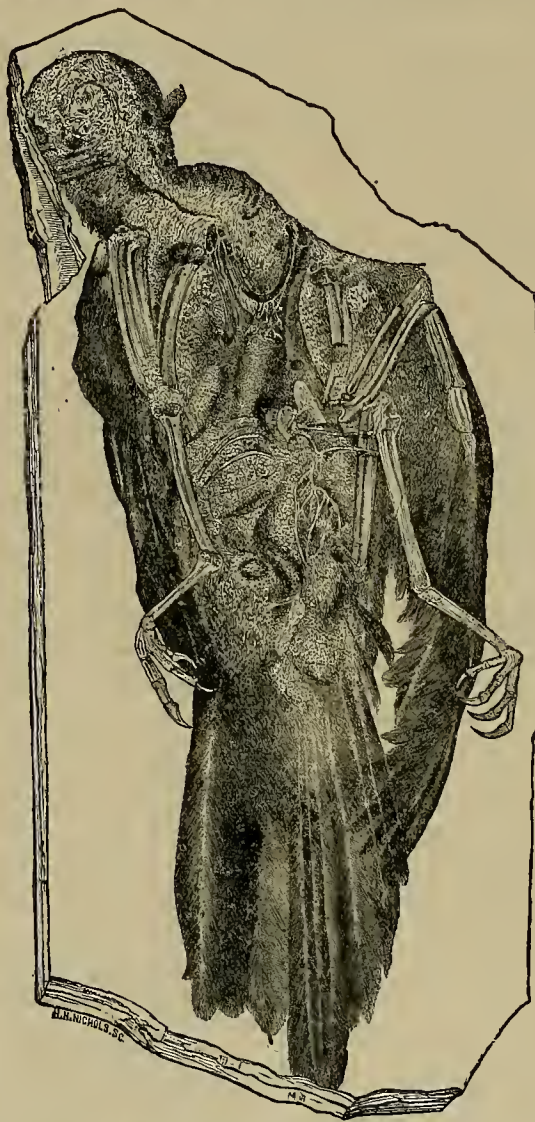
Building a Chimney.

John Morrison, chemical engineer, lately delivered an address in England on chimneys and smoke, which is reported in *Iron*. We take therefrom a few considerations concerning the principles involved in chimney building:

A chimney is one of those appliances where the conditions are too peculiar to admit of purely theoretical formulae. It must be designed chiefly by the aid and under the auspices of practical experience. For it must be observed that the case is not one simply of two equal columns of air of like weight, and in equilibrium when at equal temperatures; but one where half-a-dozen different gases, not to speak of unconsumed carbon and steam in variable and ever varying mixtures, are so many causes (any of them sufficiently disturbing) to hopelessly vitiate the results of any merely thermal calculation. I have always in chimneys advocated ample area, for excess of draft is easily checked, but shortness of the same is a great nuisance. For good furnace work indeed a rapid draft is absolutely essential, and is in reality far more economical than a sluggish one. I do not, however, believe in very large chimneys, communicating with a perfect net-work of

most efficient way of working. A chimney draft necessarily implies considerable heat waste, the waste increasing proportionately to the augmentation of the velocity; and in the case of reverberatory furnaces, where the temperature is very high, and the duty on the coal consumed very low, perhaps a properly constructed centrifugal apparatus might in some cases secure the object with a higher degree of economy than is at present practicable. Its leading advantage would be the greater facility for utilizing the spent heat of the furnace to which it might be attached, for evaporative and other purposes. This is now only to a trivial extent feasible without serious retardation of the draft. Of the extent, however, of the present heat waste, many people have, I believe, very false notions. Gases of a lower temperature than 500° Fah., it is usually—though not as a rule without an exception—far more economical to send quietly up the chimney, than to persist in devising schemes for their utilization. I do not think they are of any practical value, excepting, perhaps, for such insignificant work as crystal drying.

ST. PAUL AND PACIFIC.—Press dispatches from St. Paul say, that Messrs. Hill & Rice, representing the new owners of the St. Paul and Pacific railroad, report the transfer of the



FOSSIL PASSARINE BIRD, FOUND IN COLORADO.

flues. I think the best results are gained in those of an internal width at the summit of from 6 feet to 10 feet, and of a height equal to from 16 to 20 internal diameters. All furnaces do not of course require the same chimney capacity. Those whose fireplaces are very deep, and whose doors are frequently open, naturally require a more powerful draft than those whose doors are usually closed, and whose fireplaces are shallow. It makes an immense difference in the draft efficiency when, instead of being allowed to rush right ahead to the main flue, the products of combustion are made to return over the furnace arch or under the bed; and in the case of boiler fires especially, a good deal hinges upon the character of the coal. Some coal will cake and huru splendidly, with precisely the same amount of damper with which others will only burn to a loose cinder. It is of course manifest that the power of a chimney is diminished by the "pull" on the draft, that is to say, by the resistance to be overcome in drawing air through the fuel in the furnaces. So long as one of the most important duties of a chimney is the conveyance to such an altitude, as shall insure the proper diffusion or dispersion—before their external re-descent—of all fumes and noxious vapors, that useful and simple appliance will probably retain its present economic position. Were it merely for the creation of a draft, possibly it would not be the

bond-holding interest from the Dutch holders to Canada and Minnesota parties completed. The new proprietors have obtained a majority of the bonds on favorable terms, which will place them in possession of the road within six months after foreclosure, which will take place in June, at a cost of not more than \$10,000 in gold per mile. They expect that cars will be running from St. Paul to Winnipeg, in Manitoba, by November. The work to be done will embrace the completion of the branch line from Melrose, Starns county, to Alexandria, Douglas county, and the extension of the line from Crookston to St. Vincent, where connection will be made with the Canada Pacific.

STREET RAILROADS IN NEW YORK.—The receipts of the horse railways of New York city are said to reach nearly \$200,000 per week, the fares being 5 and 6 cents, and the number of passengers carried averages over half a million per day. The grand system of elevated roads now being pushed forward will afford vast improvement over the present crawling vehicles, and with fares at 10 cents ought to prove very profitable. The Third avenue elevated road, it is said, will run every minute trains of five cars, each holding 60 passengers; so that it can transport 18,000 passengers per hour.

A Remarkable Fossil Bird.

Heretofore Europe has led us in the discovery of fossil remains of the higher types of birds, but now, through the researches of Prof. Haydeu's survey, a locality has been found in the insect-bearing shales of Colorado, which bids fair to furnish our naturalists native material of a high order for their studies in the rock-written chapters of natural history. The highest type of extinct birds heretofore found in this country is a Picarian bird (*Urodon lucaris*), related to the woodpeckers. This fossil was described by Prof. Marsh, and was from the lower tertiary of Wyoming territory.

The engraving on this page presents a matter which is therefore new to the scientific records of our country. It is from advance sheets of a Bulletin just issued by the U. S. Geological Survey, and scores another good point for Prof. Haydeu's scientific investigators. The discoverer of the fossils from which the drawing is made was Mr. S. H. Scudder. The fortunate discovery is described by Prof. J. A. Allen, well-known as an ornithologist. He gives the new found bird a new genus and new species, and calls it *Paleoscoptes Bella*. The description of the species is based on some beautifully preserved remains from the insect-bearing shales of Florissant, Colorado. They consist of the greater part of a skeleton, embracing all of the bones of the anterior and posterior extremities (excepting the femora). Unfortunately, the bill and the anterior portion of the head are wanting, but the outlines of the remainder of the head and of the neck are distinctly traceable. The bones are all *in situ*, and indicate beyond question a high ornithic type, probably referable to the Oscine division of the *Passeres*. The specimen bears also remarkably distinct impressions of the wings and tail, indicating not only the general form of these parts, but even the shafts and barbs of the feathers.

In size and in general proportions, the present species differs little from the Scarlet Tanager (*Pyranga rubra*) or the Cedar-bird (*Ampelis cedrorum*). The bones of the wings, as well as the wings themselves, indicate a similar alar development, but the tarsi and feet are rather smaller and weaker; and hence in this point the agreement is better with the short-legged Pewees (genus *Contopus*). These features indicate arboreal habits and well-developed powers of flight. The absence of the bill renders it impossible to assign the species to any particular family, but the fossil on the whole gives the impression of Fringilline affinities.

The bones still rest in the original matrix, and, being somewhat crushed and flattened, do not admit of detailed description and comparison with other types. The furculum is well preserved, and the limb-bones are all in place in their natural relation. The sternum is unrecognizable. The position of the cervical series of vertebrae and the general outline of the skull can be traced; but no structural characters of the head can be distinguished, except the proximal portion of the mandible. The long bones all present a well-marked longitudinal groove, due evidently to compression and fracture. This groove is distinctly traceable, even in such slender bones as tibiae, tarsi, and clavicles. In point of size, while the furculum and the bones of the wing have all about the same length as the corresponding parts in *Ampelis cedrorum*, they apparently are considerably stouter. Their greater breadth may, however, be due simply to flattening from pressure. The tibiae and tarsi are shorter than in the species last named, but the difference is slight.

The most remarkable feature of the specimen is the definiteness of the feather impressions. Both the shafts and the barbs are shown with great distinctness in the rectrices, and the tips of the primaries of one wing are also sharply defined, overlying the edge of the partly expanded tail. The tip of the opposite wing can also be seen beneath the tail. The feet are so beautifully preserved that even the claws are perfectly distinct, as shown in the engraving.

The specimen is divided into an upper and a lower half, the greater part, however, adhering to the lower slab. The bones adhere about equally to the two faces. The drawing is made from the lower slab, with some of the details filled in from the upper one.

MONTANA'S PROSPECTS.—Montana never had so bright an outlook as she has at the present time. Her citizens, as a class, are in better financial circumstances than they have ever been, and unless all signs fail, they are on the road to prosperity. The winter has been a peculiarly favorable one for stock, and has enabled prospectors and quartz miners to do much work that could not have been done had the winter been as severe as usual, and this labor has resulted in most instances in developments of a favorable character.—*Helena Independent*.

KEEPING THE MONEY AT HOME.—The Boston Journal says: A New York banker estimates that \$75,000,000 of our bonds held abroad have been returned and sold in the United States during the last four or four and a half months. If this be true, the country may be considered richer by that amount, and that the four or four and a half millions of coin sent out of the country to pay the interest will hereafter be retained at home.

TWENTY THOUSAND tons of lead were produced in Nevada last year—nearly one-third of the total production of the United States.

Origin of Lakes.

Prof. Ramsay, F. R. S., Director-General of the Geological Survey, in a recent lecture at the London Institute on "The Great Ice Age," commenced with a description of a typical Swiss glacier, drawing special attention to that which is commonly called the perpetual snow line, here some 8,500 feet above the sea level, which is called perpetual rather by courtesy than as being an absolute fact. While it is the snow which furnishes the mass of the glacier, the fragments of rock carried down originate in this way: There are some deep slopes which are not covered with snow and are exposed to the heat of the sun. The alternating heat during the day and the cold of the night causes disintegration, and masses of rocks are broken off, which not only form the heap of rubbish called moraines, but some of which, falling through the crevasses, form the "graving tools" which score the mass of rock beneath into grooves. If we look further afield we find glaciers in the Himalayas, in Greenland and in Victoria Land, which make those of Switzerland appear quite insignificant. In Victoria Land the sheets of ice which float off are of enormous thickness and indicate through what a severe glacial period the Southern hemisphere is passing. The chief signs by which the former existence of glaciers in places where they no longer flow can be traced are the old moraines and scratchings on the rocks. Taking these as guides, the eye of a trained glacialist can detect with certainty the traces of long-departed glaciers in many parts of the world. The well-known examples in Wales were first mentioned, and then in succession those of Scotland and North England were described. There is evidence in Scotland that in former times the glaciers were so extensive that part flowed out through the Frith of Forth, part through the Frith of Clyde, and part over the table-land of the Lammormoor hills. Cumberland at one time was smothered in glacier ice. The glaciation of Anglesea was the result of a different system from the glaciers of Wales, as is proved by the fact that the striations of the rocks lie in different directions. The Scandinavian mountain chain has been unmistakably molded by glacier action, and there are abundant evidences that North America has been intensely glaciated. These facts had been noted by many observers, but there was a point in connection with this which Prof. Ramsay said he claimed as his own idea, and that was with regard to the origin of lake basins. His belief is that in all cases they have originated from glaciers—that is, that the basins have been scooped out by glaciers. He pointed, in confirmation of his position, to cases in many parts of the world where there are like basins near mountain chains which could have furnished glaciers, and that lakes are absent where there are no high chains. He did not, however, say that there were not some which had originated from other causes. The lecture was illustrated by diagrams and water-color drawings.

Idaho Salmon River Mines.

A correspondent writing to the Salt Lake Tribune about these mines remarks as follows: From the point where the Salmon river enters the southwest corner of Lemhi county, Idaho, it hears east for about 140 miles, then north 50 miles, after which it bends around to the west and runs in that direction till it enters Snake river, enclosing a region of country of horseshoe form, which promises, when developed, to rival any mineral district on the continent. From the southeast point of this horseshoe, rising between Salmon City on its south and Leesburg on the north side, extends in a northwesterly direction towards the head of Yankee Fork, a mountain ridge, the chief depository of valuable ore. Entering the plateau south of this ridge, the entire slope of these mountains remains continually in full view. It is covered with a park-like forest of pines, stretching away to the right and left, which promises an abundance of fuel for many years to come. The plateau, as well as the mountains, are covered thickly with grass, and many small creeks leave the mountains on this side, wending their way through canyons getting deeper and deeper towards Salmon river.

Five years ago mineral was first discovered in these mountains; it was gold, occurring in small veins, but the ore was very rich.

They seem to occupy fissures, though not enough exploratory work has yet been done to determine this point fully. The mineral occurs in three different classes of lodes, one carrying gold almost exclusively; the second, both gold and silver ore, and the third only silver. The bearing of these lodes ranges from east and west to northeast and southeast. They all dip north, carry much water and are exceedingly well defined. The mineral bearing gangue is quartz, and the width of the ore veins generally varies from 12 to 36 inches. Besides the quartz there is more or less decomposed gangue matter closely resembling the granite which forms the country rock.

These veins are numerous, but require to be opened, no work of consequence having been done here for a long time. Only recently has a wagon road been built into this region, everything before having been packed over rough mountain trails. The country abounds with fine timber, good soil, water and pasturage, and invites capital and immigration.

USEFUL INFORMATION.

A New Mailing Box for Microscopic Slides.

A new style of mailing box, contrived by Dr. R. H. Ward, editor of the Microscopical department of the *American Naturalist*, has been adopted by the Postal Club, and has proved successful beyond anything tried before. An account of it has been published in the *American Naturalist*, and we reproduce it in the hope that it may be of use to some of our readers. Whether it can be used or not will depend upon the Government decision on the point whether anything containing glass shall be allowed to go through the mails:

"In the boxes hitherto used for posting slides, the slides are occasionally found shattered to pieces, while the box containing them is quite uninjured, or only a little strained. In some boxes containing six or twelve slides, half or more of the slides have been found broken in a perfectly sound box. This seemed to indicate, not the effect of a crushing blow, but the result of the inertia of the slide itself, which was only supported by the wooden racks at the ends, and more or less perfectly by the cotton stuffed around it. An adequate occasion for such an accident might be furnished by throwing a mail-bag from a wagon to the pavement, or transferring it to or from a rapidly-moving train. It was therefore decided to reject the wooden rack altogether, and instead to support the slide by the whole of its edges and much of its sides by cloth, leather, india-rubber, or other soft and evenly-yielding material. This may be attained with the common boxes by removing the rack, lining the top, bottom and end with thick, soft cloth, and arranging folds of the cloth, glued or stitched in place, like a rack at each end of the box, so that a double thickness of the cloth shall extend between the slides from each end one inch towards the center. It is better, however, to have the boxes made for this use somewhat larger than the customary size, so that very thick beaver cloth can be used for the packing. For six slides, a box may be made of hard wood 3-16ths of an inch thick, 3 3/4 inches long, 1 1/4 wide, and 1 1/2 deep, inside measurement. The folds of cloth should be so arranged that not more than an inch in the center of the slide is unsupported, except when large cover-glasses are to be used, when more space should be left to avoid pressing on the cover. The outside of the box is covered with strong thin cloth.

"The comparative safety of this method is indicated by the experience of the Postal Club. During a trial of several months in many of the circuits, not one slide is known to have been broken while packed in this manner, while to slides in the ordinary boxes with wooden racks accidents are unfortunately frequent. For sending by express, these boxes should be made of thicker wood, or enclosed in larger cases, to prevent crushing by the weight of heavy packages among which they may be carried."

INTEREST.—"An American Almanac and Treasury of Facts," by A. R. Spofford, Librarian of Congress, contains much that is valuable for reference. We extract a few lines which express very forcibly the accumulation of interest at low and high rates: "One of the causes of bankruptcy is that so few persons properly estimate the difference between a high and low rate of interest, and therefore often borrow money at a ruinous rate that no legitimate business can stand. Very few have figured out the difference between 6% and 8%. One dollar loaned for 100 years, at 6%, with the interest collected annually and added to the principal, will amount to \$340. At 8% it amounts to \$2,203, or nearly seven times as much. At 3%, the usual rate of interest in England, it amounts to \$19.25; whereas at 10%, which has been a very common rate in the United States, it is \$13,809, or about 700 times as much. At 12% it amounts to \$84,075, or more than 4,000 times as much. At 18% it amounts to \$15,145,007. At 24%, which we sometimes hear talked of, it reaches the enormous sum of \$2,551,799,404. One hundred dollars borrowed at 6%, with the interest compounded annually, will amount to \$1,842 in 50 years, while the same \$100 borrowed at 8% will amount to \$4,690 in 50 years. One thousand dollars at 10%, compounded, will run up to \$117,390 in 50 years."

A NOVEL USE OF THE TELEGRAPH.—The electric wire has been pressed into a strange service by the Norwegian government. As is well known, the herring fishery forms one of the most important sources of income for the country, the captures being made as the great shoals come from the depths of the sea to deposit their spawn in the Norwegian fiords. It frequently happens that the object of their visit is accomplished and they return to the ocean before news of their arrival reaches the fishers on distant parts of the coast. This difficulty is now obviated by the construction of a telegraphic line of 200 kilometers in length, composed chiefly of submarine cables, by means of which the fishers along the whole coast are enabled to concentrate on the approach of a shoal at any particular fiord. The abundant captures made in this way show the investment in telegraphic wire to have been a most profitable speculation.

CLEANING OLD ENGRAVINGS.—An admirer of old engravings adopts the following plan for cleaning them: "I place them, one or two at a time, in a shallow dish and pour water over them until they are completely soaked or saturated with it. I then carefully pour off the water and pour on to the prints a solution of chloride of lime (one part liq. calcei chlorate, B. P., to 39 parts of water). As a general rule the stains disappear as if by magic, but occasionally they are obstinate. When that is the case, I pour on the spot pure liq. calcei chlorate, and if that does not succeed, I add a little acid nitro-hydrochlor. dil. I have never had a print which has not succumbed to this treatment—in fact, as a rule, they become too white. As soon as they are clean, they must be carefully washed with successive portions of water, until the whole of the chlorine is got rid of. They should then be placed in a very weak solution of isinglass or glue, and many collectors color this solution with coffee grounds, etc., to give a yellow tint to the print. They should be dried between folds of blotting paper, either in a press or under a heavy book, and finally ironed with an ordinary flat iron to restore the gloss, etc., (place clean paper between the iron and the print).

THE BEST METHOD OF ARRESTING FIRES.—On the first discovery of a fire, it is of the utmost consequence to shut, and keep shut, all doors, windows or other openings. If the fire appears at all serious, and there are fire engines at a reasonable distance, it is best to await their arrival, as many buildings have been lost from opening the doors, and attempting to extinguish the fires with inadequate means. If no engines are within reach, it is well to keep a hand-pump. If that is not to be had, the next best thing is to collect as many buckets outside the room on fire as can be obtained, keeping the door shut; then creep into the room on the hands and knees (if the heat and smoke are considerable), and throw the water as nearly in the direction of the fire as possible, keeping the door shut while more water is being collected. The police of London understand shutting up fires so well, that they have in many instances kept fires two or three miles distant from the engine stations shut up till the firemen arrived in time to extinguish them.

CHESTNUT GLUE.—Glue from chestnuts is made as follows: Free the chestnut from the brown crust, grind the kernel into flour, mix and mash it up well with water and pass it through a sieve, in which the woody fibers are retained; then wash the fine floury mass so obtained with clear water several times and let it carefully settle. The sediment or starch thus deposited is dried in the air; then again treated with chlorine water, washed again and made into glue in the same manner as glue is made from starch. The advantage of this glue for all industrial purposes is that it will retain its liquid state and power even at a cold temperature without any fire, while with the common glue it is necessary to have a constant fire in order to keep it in a liquid state.

GOOD HEALTH.

Longevity.

The London *Capital and Labor* has an interesting article on the above subject, which will be read with interest. It says: "Medical writers who have given considerable attention to the subject of vital statistics, have arrived at the somewhat extraordinary result that the higher the social grade, and the greater the means of personal indulgence, the smaller are the chances of long life. Many people accustom themselves to consider the possession of wealth an effectual guarantee for a flourishing condition of body. Such persons will be surprised to learn that in proportion as the wholesome stimulus of work is withdrawn from any class, in the same proportion the average duration of life is shortened. A little reflection, however, will serve to show the reasonableness of such a conclusion. Many a man who has passed a somewhat active career during a prolonged period suddenly retires from business, with the notion that he has only to rest for the remainder of his life, and that he now may enjoy himself. In the generality of cases the most effectual method is thereby taken to shorten life. Having nothing to occupy the mind, and being unable to take up any pursuit different from that which has chiefly been followed, the retired tradesman or manufacturer speedily falls into a physical and mental condition favorable to disease. The only chance for such a person is to discover some new employment or recreation which shall insure activity of both mind and body. There was much practical wisdom in the story told of the tall chandler who, in disposing of his business, is said to have made a stipulation 'that he should be allowed to go to the shop on hoiling days.' None of us are able to hear a prolonged fit of idleness, and least of all those who have been in the habit of regular industry. It is a well-known fact that regular living and sobriety, and a proper degree of activity for the mind as well as for the body, are essential to good health and to the right discharge of all the vital functions. While, on the other hand, luxury, indulgence and sloth are the cankers of life."

EGGS AS FOOD.—Eggs of various kinds are largely used as food for man, and it is scarcely possible to exaggerate their value in this capacity, so simple and convenient are they in their form and so manifold may be their transformations. They are exceedingly delicious, highly nutritious and easy of digestion, and when the shell is included they may be said to contain in themselves all that is required for the construction of the body. It has been claimed for them that they may be served in about 600 ways, although it is generally found the more simple they are prepared the more they are approved. Although other eggs than those of birds are eaten, for instance, turtle's eggs—it is generally agreed that the eggs of the common fowl and of the plover possess the richest and sweetest flavor. The eggs of ducks and geese are frequently used in cookery, but they are of too coarse a nature to be eaten alone. The eggs of the turkey and of the pea-hen are highly esteemed for some purposes. The weight of an ordinary new-laid hen's egg is from one and a half to two and a half ounces avoirdupois, and the quantity of dry solid matter contained in it amounts to about 200 grains. In 100 parts, about 10 parts consist of shell, 60 of white and 30 of yolk. The white of the egg contains a larger proportion of water than the yolk. It contains no fatty matter, but consists chiefly of albumen in a dissolved state. All fatty matters of the egg are accumulated in the yolk, which consists relatively of a smaller proportion of nitrogenous matter and a larger proportion of solid matter than the white. Therefore, in an alimentary point of view, the white and the yolk differ considerably from each other, the former being mainly a simple solution of albumen, the latter being a solution of a modified form of albumen, together with a quantity of fat. . . . Raw and lightly-boiled eggs are easy of digestion. It is said that raw eggs are more easily digested than cooked ones; but this may be doubted if the egg is not over-cooked. A hard-boiled egg presents a decided resistance to gastric solution and a constipatory action on the bowels.—*Cassell's Domestic Dictionary*.

TAKING COLD.—The New York *Independent* says: How shall a person who is sensitive to cold, who takes cold whenever a door is opened or a window raised—how shall such a person acquire that hardihood which will enable him to endure exposure and avoid taking cold? In the first place, he should spend a considerable portion of each day out of doors. He should do this at all seasons of the year and in all kinds of weather. Secondly, he should watch with the greatest care the temperature of the room in which he spends the remainder of his time—both the living room and dormitory. Thirdly, he should each day bathe his chest and neck, and, if he can bear it, his whole body in cold water, and follow this with a vigorous rubbing with a coarse towel. What is called the splash-bath is, perhaps, better than any other for this purpose. It consists simply in dashing water against the body with the hand. This causes a slight shock to the skin, which brings the blood to the surface; while it causes an involuntary, deep inspiration of air, which expands the lungs and increases the force of the circulation. This can all be accomplished in a few minutes, and should be followed by a little brisk exercise in a cold room or in the open air. Of course, a person unaccustomed to this should not commence in cold weather; but, beginning in the summer, he will find, as the winter approaches, that his ability to endure the bath will increase with the falling of the thermometer, and that his susceptibility to changes of temperature will be greatly diminished.

COL. BELL'S COUGH MIXTURE.—While at Sacramento the other day, says the *Napa Reporter*, we were given the formula of a cough mixture by Col. Wm. H. Bell, Sergeant-at-Arms of the Senate, which we have tried and found most excellent. In fact we feel that we ought to recommend it to all suffering from severe coughs or lung troubles. Here is the formula: One ounce golden seal, one ounce myrrh, one ounce gum arabic, one ounce prickly ash, one ounce senna, one ounce seneca snake root (*cinicifuga*), one teaspoonful cayenne pepper. Put these in a vessel with half a gallon of water, and slowly boil or simmer three or four hours, until the strength has been extracted from the several ingredients. Reduce the quantity of liquid to a quart and strain off. Then add two sticks of licorice, a pint of whiskey and a pound of rock candy. The dose is a tablespoonful four or five times a day—one always at bed-time, and the first thing in the morning. The mixture is a gentle laxative, therefore be careful not to take enough to cause inconvenience in that way. Each person must learn to regulate the doses to his own particular case and idiosyncrasies.

CONSANGUINEOUS MARRIAGES.—Mr. George Darwin, after a searching investigation, concludes that "the widely different habits of life of men and women in civilized nations, especially among the upper classes, tend to counter-balance any evil from marriage between healthy closely related persons." Mr. Darwin's views are in a measure sustained by Dr. Vorn's inquiry into the commune of Batz. Batz is a rocky, secluded, ocean-washed peninsula of the Loire Inferieure, France, containing over 3,000 people of simple habits, who do not drink and commit no crime. For generations they have intermarried, but no cases have occurred of deaf-mutism, albinism, blindness, or malformation, and the number of children born is above the average.

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The Week.

The following incidents and events may be enumerated as amongst those which have most attracted public attention the past week: The decision of Judge Sawyer of the U. S. Circuit Court, that the Chinese are not a white race, and therefore ineligible to citizenship under the laws of the United States, an opinion in which the people of this coast very generally concur. Petitions, numerous signed by all classes of people, have been dispatched to Washington, asking Congress to allow the Southern Pacific Railroad Company to extend their road east through Arizona and New Mexico, continuing it on till it meets such other road as may be built westward on that line. A further improvement in business of most kinds has been manifested during the week, building in the city especially being more active. A better feeling in regard to real estate investments also begins to prevail, the amount of sales for April having been somewhat larger than for the preceding month, with some probability that they will continue to increase, money being now abundant at cheap rates of interest and the scare growing out of the labor movement having pretty much subsided.

The Fortunes of a Pioneer Mining District.

There is hardly a more memorable thoroughfare in the State than that leading out of Sacramento east through Folsom. Along this the pioneer immigrants to California pursued their way towards their first objective point, Sutter's Fort. By this route Fremont entered the country on his first expedition, and over it he advances gold seekers passed to the new El Dorado of the West. When Peter Wimmer brought to New Helvetia the first piece of gold found by Marshall and himself at Sutter's mill, he came this way, passing by Mormon island, Folsom and Alder creek, all of them afterwards noted mining localities. Gold washing was, in fact, commenced at Mormon island and the mill almost simultaneously. The discovery of rich virgin diggings at other points, and the partial exhaustion of these earliest finds, caused the latter, in process of events, to be nearly deserted, these places having for many years retained only such small modicum of settlers as were presumably deficient in enterprise, or too poor to get away. At a later period the population began to increase, many who had mined here at an early day, after trying their fortunes elsewhere, having returned, satisfied that these old diggings were a surer thing for small wages than the Comstock or other of the great vein mines that require much money for their development.

Between the few who remained and the many who have come back, these old camps have become again quite populous, exhibiting to-day as much activity and, in the aggregate, as much thrift as any other mining localities on the coast. In the district of which Folsom is the business center, gold mining is now being carried on to a very respectable extent, and by nearly all the diversified methods practiced in California. While drift digging, by means of shafts, is much in vogue, some surface, with a limited amount of hydraulic washing is also carried on in this neighborhood, water for steady use being supplied by the Natoma ditch, a good deal having been afforded here, as elsewhere, from free sources the present winter. In addition to the river bars, which were, of course, early exhausted, there has been a great area of shallow placers in this vicinity, but not until quite lately has this been noted as a quartz mining district, as, indeed, it was not supposed to contain ore deposits of any large value. Recently, however, discoveries have been made that promise to impart to it additional consequence by adding to its mineral resources this more profitable and permanent form of mining. Not only so, but the developments being made here raise the probability that these discoveries are on the great auriferous channel known as the Mother lode of California.

Crossing the country in a northerly and southerly direction, and showing itself most strongly at a point five miles southeast of Folsom, is a quartz belt, varying from 1,000 to 3,000 feet in width. This belt, like the Comstock, the Mother lode and all *Vetas madres*, carries three distinct and nearly parallel veins or ledges, an easterly, a westerly and a middle one. Locations were made on these several veins some time ago, but not until a few months since was much work done upon them. Ever since these claims were first taken up, small bunches of rich ore have been found at places along them, which encouraged the owners to hold on and in a few cases to do some prospecting work upon them, none of them going to a greater depth than 100 feet or a little more, the most of the work having been confined to near the surface.

Among the early locators on the westerly of this series of veins was Capt. J. Beck, an old resident of Folsom. On his location, called the Lost Quartz mine, a shaft had been sunk, but so near the line separating his from the adjoining claim, as to lead to some doubt as to which it was actually on. This gentleman having applied for a U. S. patent for this ground, the survey made in connection therewith shows this shaft to be on his claim and 24 feet from the boundary. After this point had been determined, exploratory work was resumed at this point, revealing a stratum of quartz, six feet thick, that mills from \$23 to \$25 per ton, or, in other words, a first-class gold mine, the bulk of this being a free ore that can be worked very close to fire assay by the most simple and inexpensive methods of reduction in use. The sulphurets that have been saved are exceedingly rich, assaying from \$500 to \$600 per ton. In the middle of this stratum runs a strip of decomposed quartz, 18 inches wide, that contains enough free gold to warrant its being washed in sluices, paying from 2c. to 10c. to the pan. In this streak there occur pockets of amazing richness, two pounds of this material, taken out a few days since and crushed in a hand mortar, having yielded no less than \$2,000 worth of fine gold. This decomposed quartz, after sluice washing, is milled and always pays largely. This shaft has been carried to a depth of 100 feet, at which level the ledge from six feet above has expanded to seven feet, being everywhere compact and unbroken, with smooth, regular walls, the lower composed of a talcose slate and the upper of porphyry. This claim has a linear extent of 1,500 feet, running with the ledge with a surface width of 300 feet on each side.

This strike has led to a general resumption of

work on the other quartz claims hers, besides starting prospecting afresh in the neighborhood. In the absence of means for putting up mills, claim owners have constructed arastras, a number of which are now running with such good results that more may soon be expected to follow, rendering this one of the most lively and prosperous camps in the county. Meantime, Capt. Beck has ordered, at one of our foundries, machinery for a five-stamp mill, which will be up and running in a very short time.

While new life has been infused into quartz operations by this important ore find, the several branches of placer mining hers pursued are active and steadily undergoing some expansion. Several hydraulic companies are washing in the neighborhood, with average success. A good many men make fair wages drifting on the old channel that passes through here and which can be reached by shafts of moderate depth, while not a few have done equally well this season washing in the shallow placers that are open to all and which will continue to pay as long as the free water lasts. Taking it altogether, there are probably few mining communities in the State that are enjoying a larger average share of prosperity than this about Folsom. If we were asked by an unemployed miner where he had best go to get work or start in for himself, we don't know but we would as soon recommend to him this ancient camp as any other. Right in this highway, along which immigration has surged for a third of a century; over which multitudinous thousands have come and gone; which was trod by the feet of the first gold finders and traversed by the pioneer railroad of the Pacific, the chances for one who wishes to mine in a sure and small way are about as good perhaps as in any other in California. As remarked in the last issue of the PRESS, the gold deposits of this State do indeed seem to expand under working, the developments in this article mentioned furnishing a case in point.

Montana Mining Interests.

We have received a brief intimation from some individual in Montana to the effect that the PRESS is apt to ignore mining matters in that part of the country, while it gives full details concerning other points on the coast. The person referred to is totally and entirely mistaken, and we are pretty certain he has never read the PRESS much or he would not have made any such assertion. Our "Mining Summary" is made up mainly of extracts from journals published in the immediate vicinity of the mines in the various localities, and we are careful to glean every item of interest which may be published. We sent a special correspondent to Montana last year and published from him a series of very interesting letters describing the various mines and districts in detail, and have also published whatever of interest from that section which we have been able to obtain from the local papers or from correspondents. The latter are, unfortunately, scarce, and we should feel very grateful to any persons who have interest enough in the part of the country in which they live, to send us a letter concerning it occasionally. It is hardly worth while for us to enumerate the various articles on Montana and its resources which we have published of late. Suffice it to say we have not omitted mention of that Territory whenever it was possible to obtain any items from there which would be of general interest. If the person who wrote to us on the margin of a paper will communicate with this office we shall feel obliged.

Our Editorial Rooms.

The editor thus publicly makes acknowledgment of the indebtedness which he and the readers of the PRESS owe to the publishers, for a complete renovation and refurnishing of our editorial rooms. We count the readers in the indebtedness, because we really think snowy walls, crystal windows, brightly painted woodwork, and cleanly covered floors, must tend to sharpen editorial points—whether they be of scissors, pencil or brain—and the result would be a fresher character to the matter which fills our columns. Whether this will indeed follow, the future only can tell. Our windows are clean, and now we are in sympathy with old Goethe in his cry for "more light." There is one point which may be of practical value to some of our readers who are contemplating improvements of their abodes or outbuildings. We have had opportunity to test the qualities of the Averill mixed paint by ocular demonstration, and we do not hesitate to praise it most highly. It has a body, a covering quality, and a beauty of finish which makes our simple woodwork look like slabs cut from the rosy morning. It speaks its own praise to all who see it.

FINE SPECIMEN.—We have received a very fine specimen of gold-bearing quartz from the Knox and Bell ledge, Grizzly gulch, near Whiskey town, Shasta county. The specimen was presented to us by Mr. Wm. Thompson, of Reading, and shows a handsome little nugget on one side of it, such as would gladden the eyes of any miner.

Exploiting the Pliocene Rivers.

Experience establishes that the policy of Californians going abroad to make mining investments, is one of doubtful expediency. As a general rule those who have kept nearest home have fared the best. There mingles with our hydraulic and drift operations, an element of certainty that is beginning to have its influence with the cautious capitalist and the prudent of all classes, and even our quartz mines have with these grown in favor of late. The success that has attended some of the drift operations in this State, is strongly attracting the attention of investors towards this class of claims, which, wherever they have been thoroughly opened and drained, have yielded magnificently. The field of exploitation here consists of the pliocene channels—the so called "dead rivers" that traverse in almost every direction the central and more northerly mining counties of California. Under the impression that there was but a single one of these streams, the first one discovered was denominated "The Blue Lead," this name having been given to it on account of the color of the lower and richer stratum of gravel it carried, and because it was then supposed to be a lead or lode of some kind of decomposed mineral substance, no one supposing it to be the channel of a buried river. Afterwards more of these channels were discovered, and their true characters ascertained; but even so late as 1868 only the main channels of these "dead rivers" had been traced, as may be seen by referring to Doolittle's map of central California, published in that year, and upon which all the channels up to that time recognized were accurately laid down. Since then many additional channels have been discovered, the most of them of lesser magnitude, being, probably, branches of the main streams, and also others, not so broad or deep-lying, having been formed, perhaps, at a later date.

On the main streams have been situated the diggings that have gained for these pliocene rivers their fame as gold producers, and which, extending from Plumas to Mariposa, have fully sustained for more than a quarter of a century, their ancient and well deserved renown. From them came the wealth that has distinguished a hundred camps along the great California gold belt, their erosion having been, in fact, the principal source of enrichment to all our modern streams.

At first these ancient channels were exploited wholly by tunneling, this method being still in use where natural facilities favor its adoption. In the absence of these it is not, however, always practicable. In these cases recourse must be had to the perpendicular shaft, which, where there is not much water to hoist, answers almost equally well, while it is in the first instance much cheaper, their construction costing on an average not one-quarter as much as tunnels. Latterly the employment of shafts has been much resorted to, the sinking of a considerable number of these being now in progress. The most noted structures of this kind are located in the vicinity of Forest City, and along Slate creek in Sierra county; about Nevada City; on the Forest hill divide, in Placer county, and near Folsom, in Sacramento county, there being great numbers of them scattered over the mining regions elsewhere. At Forest City they have to sink to considerable depths to reach the rich pay stratum, which always lies at the bottom of the channel. The Pliocene company, putting down a shaft in that neighborhood, have already sunk a distance of 200 feet, and will probably have to go 50 or 75 further. About Folsom, on the contrary, the shafts do not average more than a quarter of this depth, while around Todd's valley, on the Forest hill divide, a depth of less than a hundred feet suffices to reach the old channel, which at this point has been opened and worked with great success by various companies.

A very important work is now in progress here by the Blue Gravel Range Company, who are sinking a shaft on the principal channel that traverses this section of the county. A more eligible site for the purpose could hardly have been selected, this shaft being situated just below the junction of the Yankee Jim and Forest hill branches, two of the richest of these old channels ever opened in the State. When completed, this shaft, already well advanced, will, without doubt, open up one of the most prolific of all these subterranean repositories yet explored. Considering how well this class of deposits has paid wherever they have been properly opened and worked, how easily proprietorship can be obtained, and how cheaply they can be outfitted and developed, they would certainly seem to invite the attention of those desirous of embarking either their labor or money in the business of gold mining.

TWO-HEADED SNAKES IN COLUMBIA.—A friend brings us information of a double-headed snake killed in the State of Tolima, United States of Colombia, South America, close to the village of Santa Ana. The natives call this snake the "Talla Aykiss," and it is said to be one of the most venomous snakes of the country, and grows to the length of 15 feet. A specimen was brought to California by C. R. Clark, late Sheriff of Nevada county. It is now in possession of Miss Mary Gass, Oakland. Mr. Clark put in the first regular sluices for mining in Colombia.

A Free Public Library for San Francisco.

Our people are at length beginning to act in the matter of establishing a free library in San Francisco, a movement that for the credit of the city and the welfare of the rising generation has been deferred too long. From the character of the men who have taken the business in hand and the popular interest manifested on the subject, there is good reason to hope that these efforts will result in the early creation here of an institution of this kind that will compare favorably with those existing in other large towns and do honor to its founders. At a meeting of the people, held some two weeks since, a committee, composed of our most influential and intelligent citizens, was chosen to confer with the Board of Supervisors in relation to this matter, and to take such other preliminary steps as might to them seem proper in the premises. Being without funds to purchase books or even secure suitable rooms to begin with, this committee have applied to the Board of Supervisors for an appropriation sufficient to secure these ends in a small way, it being probable that suitable apartments can be had for the purpose in the old City Hall, portions of which will soon be vacated by the present occupants. Should this be the case, a few thousand dollars would suffice to purchase enough books to commence with, it being safe to count on some donations from private parties, if, indeed, it might not confidently be expected that some of our rich men would avail themselves of such a favorable opportunity to glorify their names by liberally endowing the institution from their own coffers. Through nothing left of all their great fortunes will the memories of Girard and Astor be so well preserved as through the college and the library that bears their respective names. Let this be marked by such of our millionaires as would hereafter be remembered with gratitude and praise.

If, however, individual bounty cannot be depended upon to accomplish this beneficent work, the public funds must be made to do it. An annual contribution of \$50,000 or \$60,000 from the city treasury would suffice, if continued for a series of five or six years, and certainly no better investment could be made if we contemplate this subject solely from a financial point of view. A reading community is not apt to be an improvident or an immoral one. But they cannot read without books, and to supply these in the most economical way, and of the right kind, can best be effected through the instrumentality of a free public library.

Where to Go.

We are inquired of as to what part of the State seems to afford the best chance for surface diggings. Just now, and for the few weeks that water, coming through other than artificial channels, will last, small wages can be made in almost any of the mining counties, working the surface placers. After that, it will be difficult to make even small wages anywhere in this class of diggings, the best opportunities offering being found in the more northern counties, such as Sierra, Plumas and Siskiyou. As to the precise localities of such diggings, even there we are not fully advised, though a person visiting that region would have no trouble in ascertaining their whereabouts. There are plenty of rich spots left, but they are without water and so situated that none can be readily brought upon them; there being also many places where fair wages could be made in this class of mines, that are now occupied by the Chinese, who hold them under bills of sale or leases from the whites. It is much easier now to find places where wages can be made at drift than at surface mining. In most of these places long tunnels require to be run, while in others the pay gravel can be reached through shafts varying from 20 or 30 to 100 feet in depth, as in the vicinity of Folsom, concerning which we have spoken elsewhere in this issue of the PRESS. As this kind of diggings are tolerably common and easily opened, they are perhaps as good as any for the laboring man with small means to engage in. The best way, after all, for the man who wishes to get to work in this branch of mining, is to go out into the mines and look about for himself, keeping in view the general fact that the counties mentioned offer the best opportunities for his doing so. When the active, industrious man gets out into the mines, wherever it may be, he is apt to find a good chance for doing something.

BULLION SHIPMENTS.—Since our last issue, shipments of bullion from the prominent mines have been as follows: California, April 24th, \$145,424.79; Con. Virginia, 24th, \$100,612.44; McCracken, 23d, \$17,500; Christy, 25th, \$5,627; Tybo Con., 20th, \$3,804.55; Star, 23d, \$6,500; Northern Belle, 22d, \$2,086.05; Gold Hill (Idaho), for April, \$12,194; Tybo Con., 22d, \$3,874.36; Manhattan, 26th, \$16,500; Standard, 24th, \$18,309.41; Northern Belle, 24th, \$3,603.50; California, 27th, \$115,036.25; Con. Virginia, 27th, \$136,651.06; Justice, 27th, \$10,997.58; Tybo Con., 25th, \$7,880.58; Tybo Con., 26th, \$3,985.92; Mabattan, 29th, \$15,900; Christy, 30th, \$7,641; Grand Prize, 30th, \$17,800; Northern Belle, 27th, \$3,654.01.

The Art of Mechanical Design.

(Written for the PRESS.—No. 2.)

The first question which presents itself to the constructor of machinery is the requisite strength and thickness of the metal. Take, for example, the cylinder illustrated in the previous article. I have often been asked for a mathematical rule for the same. None, however, exists. It is simply a question of practice, experience and use, and as the thickness of cast-iron does not vary much, by actual practice one can readily say to a sixteenth of an inch for almost any part of the different sizes of steam engines.

As a rule, the tendency is to make all parts too thick. Notable instances have occurred where, owing to a settling of the metal, cylinders have been working for years one and a quarter inches one side, with scarce a quarter inch of metal on the other. The proposed thickness in this case was three-quarters of an inch—experience proved five-eighths ample. The proportions of the parts of the horizontal steam engine are found to vary little, and the diameter of the piston-rod is taken as a standard from which all working parts are proportioned, as stated in the numerous tables published; the diameter of the cylinder likewise forms the basis of proportioning the capacity of all the steam ways, chambers, etc.

Care must be taken to round off all the corners. If it be true, as stated, that there is no straight line in nature, or natural growth and

Fig. II.



Fig. III.



BEST'S IMPROVED WASHING MACHINE.

construction, we find it to our advantage to follow this precedent and example here set forth, and blend in suitable curves one line with another, making all separate parts form one solid, compact and substantial structure. These points borne in mind, the process of designing framing for any machine is much simplified, and becomes an easy routine with a little practice. This point is closely allied to the mining interests of this coast. Heretofore it has been in that and many other cases simply a question of crowding all the metal into the parts that could be used, and in numerous parts one-third of the metal used could conveniently be dispensed with, with no diminution of strength, and much saving in transportation of bulk.

The eye, with a little practice, soon learns to detect the curves of greatest strength and economy in the designs of cast-iron framing, and many tons of metal might be saved annually in the construction of mining machines in this particular. The branches of a tree, the limbs of the human body, form the very best pattern for the model maker and machinist, where designing the lightest and yet the strongest sections of metal in machine framing.

It is to be hoped that every mechanic who has seen the previous number of the PRESS, bas, by following the easy instructions therein contained, drawn out the steam engine cylinder, piston and rod, as fully therein explained.

Minute matters, in designing, as in every other industry, can alone command success, and we now direct the attention of all to the small curve filling in and taking the place of every corner where the metal is altered in thickness or shape; this, as will be readily seen, is to strengthen and render compact the varied shapes of the cast-iron cylinder, and should be carefully reviewed and corrected by the student in his own drawing. If he now finds it agrees

with the design of the steam engine cylinder, heretofore produced, he may rest satisfied that he has mastered no small but an invaluable task in the art of mechanical design. One practical lesson suggests itself on closing this article. Don't waste money in experimenting, but go and draw out your ideas. The first step in success is to possess a fair working drawing. J. HEBURN, Engineer.

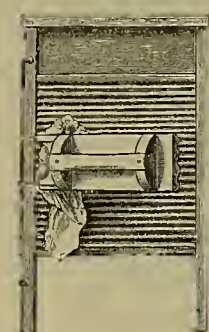
Best's Improved Washing Machine.

The accompanying engravings illustrate an improved washing machine, patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by Daniel Best, of Auburn, Baker county, Oregon. Fig. 1 shows the machine in operation. There are two horizontal rollers placed in a frame, as far apart as the width of the side-boards. Around these rollers runs an endless slot-belt. A crank applied to one of the journals of the rollers, works the belt round the rollers. A series of small rollers are mounted parallel with each other above the slot-belt, each having a spiral spring, so that it will exert an independent pressure on the upper surface of the moving belt. The clothes to be washed are taken singly and introduced between the endless belt and the rollers, when, by applying the brake shown on top of the machine, the rotation of the rollers is retarded and the endless slot-belt travels on, thus holding and rubbing the clothes very similar to the process of washing by hand. The clothes are also squeezed between the belt and rollers, so that the dirty

Fig. I.



Fig. IV.



water is expressed, thus preparing them to receive a fresh saturation after they drop into the tub again.

Figs. 2 and 3 speak for themselves, as showing the difference between washing with a machine and by hand, and the influence it exerts in household economy and comfort.

Fig. 4 shows another apparatus devised by Mr. Best for utilizing a common wash-board, and taking the friction off the knuckles. A rod or guide is attached to the side of the board, and a rubber connected to it by means of arms which slide on the rod, so that the rubber may be moved up and down. The rubber way is tipped back and the clothes placed on the board. Then the rubber is turned back, and by taking hold of the handle and working the rubber the clothes are quickly scrubbed. The hard rubber has a corrugated surface, and the wash-board has corrugations formed by small rollers instead of grooves, said rollers being free to revolve as the hand rubber is moved back and forth over them. These devices are both of great utility, and of simple construction. Mr. Best may be addressed as above for further information.

OCEAN STEAMER AT ST. LOUIS.—The Secretary of the Navy announces his intention of testing the navigation of the Mississippi river by sending an ocean steamer, the *Plymouth*, on an expedition in June. She will start from New Orleans, with order to ascend the river during the June rise as far as possible. Two years ago the *Plymouth* came up the river as far as Natchez, and this year she hopes to come as far as St. Louis.

INDIANS ON PUYALLUP RESERVATION are busy clearing and planting, and this year will cultivate more land than ever before.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

AUTOMATIC WEIGHING DEVICE AND REGISTER.—J. C. Hunt, Sheridan, Placer county, Cal. The improvements are in devices for automatically weighing and registering grain and other substances. They consist in a rotating, self-discharging weighing scale, having a vertical movement, by which its position is changed when full or empty, and this alternate change of position is made the means of operating a gate or valve, to shut off and admit the material to the scale and also operate the registering device. The operation of continued weighing, discharging and recording will continue as long as material is supplied to the machine.

FOLDING CARRIAGE DOOR.—Anthony Bink, S. F. The improvements relate to that class of carriages in which the top or hood is made to be thrown back or forward, so as to leave an open carriage. The invention consists more particularly in a novel construction of the door with its pillar, top bar and rear standing pillar, so that, while they may be folded down out of the way in the open carriage, it will be possible to form a complete door-frame when the hood is up.

SPINNING TOP.—Christopher Raetz, S. F. This spinning top has a handle with a torsional actuating or propelling spring and an actuating shaft, constructed with a notched end, so that it may be temporarily connected with the corresponding end or stem of the top. There is also a trigger, which holds the spring or releases it when desired. The spring is wound up, and, by pulling the trigger, the top will be disengaged from the clutch by the momentum of the spring and is thus caused to spin.

COUNTING AND FORMING COIN PACKAGES.—Jas. Ostergard, Cherry Creek, Nev. The device is intended for counting a number of coins and forming them into a roll, so that they can be conveniently covered or inclosed either by paper or other form of coin holder. It consists of a metallic base, having vertical standards, between which a certain number of coins are placed to form a package.

CARRIAGE.—Joseph J. Gallagher, Davisville, Yolo county. This invention relates to certain improvements in the construction of carriages, and consists in a novel construction and combination of springs for supporting the buggy and also in the gearing.

NAPKIN HOLDER.—Lucius Thompson, S. F. This improved device is intended for clasp ing or holding the corner or edge of a table napkin, in combination with a hook for suspending it from the neck-band of a person, for protecting his or her clothing while eating.

HYDRAULIC MACHINERY REQUIRED IN CHILE.

—Mr. John Sewell writes from Valparaiso to his brother in this city, advising him of the return of Mr. H. Holcombe from a prospecting trip in the auriferous gravel fields of Southern Chile. He represents the country as being in every respect a fine one, possessing a cool, pleasant climate and abounding with splendid forests. In washing with the hatea he found ground of such promise that he was induced to leave 50 men to test it in depth. The merchants of Valparaiso outfitted this expedition, contributing in the first instance \$3,500, which will now be followed up with the amount of funds necessary for working purposes. As the business of hydraulic mining is likely to be inaugurated in that country, it might be well for our foundrymen and others engaged in the manufacture of implements and apparatus adapted to that use, to take measures for supplying the same to these Chilean miners, who, in the course of time, may possibly require a good deal in this line. A responsible English house in Valparaiso have, we are informed, signified their willingness to receive consignments of this class of goods. Concerning this house more full particulars may be learned through Mr. Henry Sewell, at 315 Pine street, Room 34, in this city.

RAILROAD IN ECUADOR.—The *American Manufacturer* says: A party of Americans now in Ecuador are negotiating with the government of that country for the building of a railroad. We have received another letter from our correspondent in Ecuador, in which he says he hopes shortly to be able to give particulars. He writes: "Such a work will make a greater change in this country than a similar one in any other, on account of the utter want of facilities for communication existing at present, and its accomplishment will be of immense value to the United States, both as to influence and commercial interests."

The people of Oregon are delighted with the new steamer bearing the name of their State, which lately arrived out from New York in the short space of 57 days 2 hours running time. She is the largest and finest steamer that ever visited Portland.

FOREIGN PATENTS

FOR PACIFIC STATES INVENTORS

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names, thus avoiding their being published to
the world in the name of a foreign agent, as is
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cies.

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different patents in the United States, on the
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As the privileges of our inventors are cut off
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be valuable in various populous civilized coun-
tries, to lose no time in applying for patents
whenever they intend to obtain them for them-
selves or the benefit of others—with their own
means or through the resources of those who are
permitted to share the benefits. It must be
remembered that the English (and some other
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ents to the first introducer (which means the
first applicant), without regard to the rights of
the actual inventor, who has no after recourse.

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Argentina Republic.....	25 years or more, de- termined by gov't.
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cessful presentation of my claim for a patent on a pump
power, not only delights me, but suggests the propriety
of my continued patronage and that of all my friends.
With kind wishes for your future success, I subscribe my-
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A. L. HUNSAKER.

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(From the Pittsburg Post, December 24th, 1877.)
\$5,000 for the Poor of Pittsburg if Mellor
or Weber Furnish Proof.

To the Editors of the Pittsburg Post:—Mr. C. C. Mel-
lor, in his card entitled "A few facts for the public to
consider," which appeared in your columns on the 15th
instant, states as follows:

"The subject Weber's figures, and the Judges' names
attached to them, are as follows:

Now, then, if Mr. Albert Weber, or his agent, Mellor,
can or will produce any document, certificates or writing,
with the genuine signature attached of the Honorable
H. L. Oliver, Geo. F. Bristow, P. F. Kupka and Julius
Schiedmayer (or a majority of them) who were the Exam-
ining Judges at the Centennial Exhibition, Philadelphia,
1876, declaring or certifying that Weber received a higher
average than 90% out of a possible 96; or, if Mr. Weber, or
his agent, Mellor, can prove the genuineness of the signa-
ture of some gentleman (or a majority of them) that Weber did
receive more than \$3 on Square Pianos out of a possible
96; or 93 on Upright Pianos out of a possible 96; 93 on Parlor
Grand out of a possible 96; 93 on Concert Grand out of a
possible 96; or, if Mr. Weber or his agent, Mellor, can
show by a certificate or statement in writing of the same
judges (or a majority of them) that Steinway's claim,
sustained by official and documentary evidence is not true
and well founded, viz:

That Steinway ranked first in every style of Piano,
and that Steinway did receive 90 on Square Piano out of
a possible 96; 96 on Upright Piano out of a possible 96;
96 on Parlor Grand out of a possible 96; 94 on Concert
Grand out of a possible 96, we will place the sum of \$5,000
in the hands of the Mayor of the city of Pittsburg, to be
distributed for the benefit of the poor of our city.

The public must understand that Weber's figures, as ad-
vertised by Mellor, are false and fraudulent, and that they
are given upon Mr. Weber's own authority only, and
against the repeated and published protests of the Judges,
whose names he misuses.

We again declare Mr. Weber's assertion of having re-
ceived on any one of styles of pianos '95 out of a possible
96,' and his alleged ratings on the Steinway Pianos, viz:
91 out of a possible 96, to be a barefaced falsehood, un-
supported by any documentary evidence from the Judges,
and contrary to their published declaration.

Respectfully yours,

H. KLEBER & BRO.

We will Mr. Mellor furnish the desired proof, and thus
benefit the poor of Pittsburg to the amount of \$5,000, or
will he stand convicted of having willfully assisted to de-
ceive and hoodwink the public ever since the Centen-
nial?

Letter from the Great American Composer,
Geo. F. Bristow.

New York, December 17th, 1877.

To the Editors of the Commercial Gazette:—Dear
Sir:—My attention has been directed to a card of Mr. C.
C. Mellor, appearing in your issue of the 15th instant,
containing certain figures purporting to have been made
up by the Examining Judges at the Centennial
Exhibition, Philadelphia, 1876. Mr. Mellor and other
Agents of Mr. Albert Weber quote my figures on the
Steinway Pianos incorrectly. I gave to Messrs. Steinway
& Sons, on account of the general excellence of their in-
struments, the following figures, viz: tone 6, equality 6,
touch 6. Moreover, I have never authorized Mr. Albert
Weber to make use of my name in connection with his
pianos, as a member of the Group of Judges XXV, United
States Centennial Exposition. Respectfully yours,
GEORGE F. BRISTOW.

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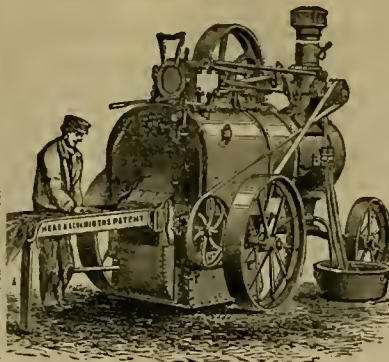
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And Edger Circular Saws with Recent Improvements,



Made especially to meet the requirements of the heavy work of this Coast, are now giving perfect satisfaction in the many mills in which they are in use.

A SIXTY DAYS' TRIAL,

Which we allow responsible parties, will convince them that they cannot too soon avail themselves of the advantages of a saw that is in perfect condition to run when they receive it, and always remain sharp, exactly round, and precisely the same to a hair in every respect, without any of the expensive skilled labor which other saws constantly demand. Both Filers and Filee are dispensed with.

The teeth being always the same length, and the cutting angle always the same, they never dodge, but go through the knots in a surprising manner.

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The advantages being too numerous to mention in an advertisement, parties will please send for circulars and say they saw this in *Mining and Scientific Press*.

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The elastic hinge and band accommodate and hold firm either a large or small number of papers.

With less material, it is lighter and less cumbersome than other holders, and approaches nearer to bookbinding.

It has no rigid hooks, hinges or loose parts to break or get lost.

It has proved durable in practice. The file is adjusted but 52 times a year for a weekly paper, and a sample holder can be opened and closed 1,000 times without showing wear.

Five sizes are made to suit the dimensions of different papers, viz.: 18, 22, 26, 30 and 34 inches, inside measure.

Single samples will be mailed from office for 50 cents, (and upward, according to size), postpaid. Wholesale and retail agents wanted.

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Working Capital Furnished for good Mining Claims, Assays, Surveys, Specifications and estimates of all kinds made.



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Mechanical Draftsman and Engineer,

No. 214 Sansome Street, (Room 29,) S. F.

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PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING, APRIL 16TH.

GOVERNOR FOR STEAM ENGINES.—Warren H.

Craig, S. F.

DEVICE FOR CUTTING SCREW THREADS.—

Michael Minahan, Portland, Oregon.

HAMES.—Albert P. Rose, Beowawe, Nevada.

DITCHER AND CULTIVATOR COMBINED.—Owen

T. Davis, Brighton, Cal.

THUMB RESTS FOR SHEEP SHEARS.—John Rich-

ardson, Jr., Pomona, Cal.

SHAFT COUPLING.—Curtis G. Rowell, Dallas,

Oregon.

PRUNING SHEARS.—John Wilz, Santa Cruz.

FEATHERING PADDLE WHEEL.—Thomas Cul-

len, S. F.

MANUFACTURE OF SHIRTS.—William D. Lawton,

S. F.

ORE AMALGAMATORS.—Walter S. Shotwell, S. F.

Thirtieth Industrial Exhibition of the Mechanics' Institute, S. F.

The Board of Managers have the honor to announce that the Thirtieth Exhibition of the Mechanics' Institute, and the fifth annual one given in the grand pavilion on Mission, Market and Eighth streets, will open to the public August 6th, and close September 7th, 1878.

The public are respectfully requested to respond liberally as exhibitors and visitors, and thus enable the Board of Trustees to realize from this fair a sum sufficient to liquidate the small indebtedness now due on the Mechanics' Institute library property, and to answer a speedy fulfillment of the sanguine hope of the Trustees and well-wishers of the Society to make it a free library for mechanics and apprentices, the Board to institute permanent classes for instruction in the mechanic arts.

The exhibition building is 550 feet long, 200 feet wide, centrally located, and accessible by six lines of street cars, giving direct communication with all parts of the city.

The promenade is a gallery under the main nave, 16 feet wide and 1,000 feet long, from which an unobstructed view of the interior is obtained.

In addition there is an annex 220 feet long by 75 feet wide, containing the exotic garden, which will contain all that is rare and beautiful in the floral and horticultural world, increased by the finest rustic and picturesque effects obtainable. The whole, pavilion and garden, will be brilliantly illuminated at night.

The art gallery, 400 feet long by 50 wide, will be made specially attractive by paintings, statuary and works of art. The Managers are happy to announce that the San Francisco Art Association have kindly consented to take charge of the same, and that our local artists have promised to display their best productions.

Among the many attractions this year the musical part of the exhibition will be a noted feature, as the best obtainable orchestra will each afternoon and evening give a grand instrumental concert, introducing the latest and most pleasing novelties of musical composition.

A fine refreshment saloon, restaurant, and 4,500 comfortable seats will be provided for the convenience of visitors, of which the average attendance during the last exhibition was 12,500 per day.

The Board of Managers particularly desire that the natural and manufactured products of this coast should be well represented, and to that end all possible facilities will be extended to exhibitors of such articles.

A large and powerful engine will furnish ample motive power, while steam and water will be furnished for such machines and appliances as require them, free of cost to the exhibitors. The main line of shafting is 490 feet long, with pulleys sufficient for all requirements.

It is expected that the various transportation companies will convey goods intended for exhibition at one-half the usual rates.

The matter of premiums has not yet been determined upon.

Applications for space, rules and regulations, or any information regarding the exhibition, will be given or sent by addressing the Secretary.

Board of Managers:

Irving M. Scott, Henry L. Davis, Asa R. Wells, James Duffy, C. Waterhouse, George Spaulding, James Drury, H. S. Smith, James Spiers, D. A. McDonald, J. B. Stetson, H. L. Hutchinson, Nathaniel Hunter, A. L. Fish.

J. H. CULVER, Secretary, 27 Post st.

Woodward's Gardens were never more attractive than at present. A fine lion and two lionesses, all young and not fully grown, have just been added. Balloon ascensions by Prof. Martin are now being made. The popularity of the gardens continues to increase. Rates of admission unchanged.

AYER & SON'S MANUAL contains information of much value to advertisers; sent free. Address N. W. Ayer & Son, Advertising Agents, Times' Building, Philadelphia.

MODEL MAKER AND MACHINIST.—I. A. Heald, No. 514 Commercial St., San Francisco, (fourth floor).

GENERAL MERCHANDISE.

(WHOLESALE.)

WEDNESDAY M., May 1, 1878.

Plaster, Golden Gate Mills, 3 00 @ 3 25
Land Plaster, 2 00 @ 2 50

Assorted sizes, keg 3 25 @ 4 00

SALES.

Pacific Glue Co's

Neatfoot No. 1, 60 @ 90

Caster No. 1, 10 @ 60

do No. 2, 10 @ 60

Baker's A. A., 25 @ 130

Oliver, Flagstaff, 25 @ 130

Posner, 4 75 @ 25

Palu, B., 9 @ 60

Linsed, Raw, lib, 74 @ 60

Boiled, 77 @ 60

Cocoonut, 57 @ 70

China nut, 60 @ 65

Sperm, 1 80 @ 65

Coast Whales, 60 @ 65

Polar, refused, 60 @ 65

Lard, 10 @ 15

Olus, 27 @ 60

Devote's Bril, 27 @ 234

Photolite, 29 @ 60

Nouparel, 50 @ 60

Eureka, 40 @ 42

Light kerosene, 20 @ 42

Downer Kor, 40 @ 42

Elaine, 42 @ 60

PAINTS.

Pure White Lead, 9 @ 10

Whiting, 15 @ 60

Chalk, 15 @ 5

Paris White, 2 @ 60

Ochre, 34 @ 60

Venertin Mixed, 31 @ 60

SOAP.

Paint, gal, 2 00 @ 2 40

White & Blue, 2 00 @ 2 40

Green, 2 00 @ 2 40

Ch Yank, 3 00 @ 3 50

Light Red, 3 00 @ 3 50

Metallic Red, 20 @ 60

RICE.

China No. 1, B., 61 @ 62

Hawaiian, 61 @ 7

SAIT.

Cal. Bay, 10 @ 22 50

Common, 10 @ 22 50

Carmen Id., 13 @ 22 50

Liverpool type, 20 @ 22 50

Castle, Id., 10 @ 10 50

Common brands, 4 @ 6

Fancy brands, 7 @ 8

SPICES.

Cloves, lb., 45 @ 50

Nutmegs, 22 @ 50

Pepper Grain, 15 @ 17

Pimento, 15 @ 16

Mustard, Cal., 1 @ 10

SUGAR, ETC.

Cal. Cube, lb., 11 @ 12

Powdered, 12 @ 12

Fine crushed, 11 @ 12

Golden C, 11 @ 12

Cal. Syrup, kgs, 70 @ 70

Hawaiian Molasses, 26 @ 30

TEA.

Young Hyson, 35 @ 50

Moynay, 35 @ 50

Country pek Gung, 35 @ 50

powder & Imperial, 50 @ 60

Hyson, 30 @ 35

Japan, 1st quality, 40 @ 60

2d quality, 25 @ 35

METALS.

(WHOLESALE.)

WEDNESDAY M., May 1, 1878.

IRON.—

American Pig, ton, 28 00 @ 30 00

Scott Pig, ton, 28 00 @ 30 00

White Pig, ton, 28 00 @ 30 00

Oregon Pig, ton, 28 00 @ 30 00

Refined Bar, 21 @ 31

Horse Shoes, keg, 5 00 @ 6 00

Nail Rod, 5 @ 72

Norway, Oval, 5 @ 72

COPPER.—

Sheathing, lb., 34 @ 35

Sheeting, Yellow, 12 @ 35

Sheeting, Old Yellow, 12 @ 35

Composition Nails, 24 @ 35

Composition Bolts, 24 @ 35

STEEL.—

English Cast, lb., 13 @ 14

Anderson & Woods, ordinary sizes, 15 @ 16

Drill, 15 @ 16

Flat Bar, 14 @ 12

Flow Steel, 8 @ 12 50

TIMBER.—

10x14 C Charcoal, 7 50 @ 8 00

Dana Tin, 23 @ 24

Australian, 17 @ 17 1/2

ZINC.—

By the Case, 9 @ 10

Zinc Sheet 7x3 ft, 7 to 10, lb., 9 @ 10

7x3 ft, 11 to 13, 10 @ 10

8x4 ft, 8 to 10, 11 @ 10

8x4 ft, 11 to 13, 11 @ 10

NAILS.—

Assorted sizes, 3 15 @ 25

QUICKSILVER.—

By the lb., 43 @ 45

LUMBER.

(WHOLESALE.)

WEDNESDAY M., May 1, 1878.

CARGO PRICES OFFICET SOUND PINE.

REDWOOD.

Rough, M., 13 00 @ 18 00

Refuse, 9 00 @ 18 00

Clear, 23 00 @ 30 00

Clear Refuse, 13 00 @ 25 00

Rustic, 23 00 @ 30 00

Refuse, 18 00 @ 25 00

Surfaced, 20 00 @ 30 00

Refuse, 20 00 @ 30 00

Refuse, 12 00 @ 14 00

Beaded Flooring, 23 00 @ 30 00

Refuse, 13 00 @ 16 00

Half-inch Siding, 15 00 @ 20 00

Refuse, 14 00 @ 20 00

Half-inch Surfaced, 20 00 @ 30 00

Refuse, 14 00 @ 20 00

Half-inch Battens, 16 00 @ 20 00

Pickets, Rough, 11 00 @ 15 00

Rough, Pointed, 12 50 @ 30 00

Fancy, Pointed, 18 00 @ 20 00

Shingles, 1 75 @ 2 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, May 1, 3 P. M.

LEAD TENDERS IN S. F., 11 A. M., 93 @ 100. SILVER, 2.00 @ 2.25. GOLD IN NEW YORK, 100.

GOLD BARS, 89 @ 90. SILVER BARS, 8 @ 15 @ cent. dis. count.

EXCHANGE ON NEW YORK 1/2 % on London bankers, 49 @ 49 1/2. Commercial, 50; Paris, 490 francs @ dollar; Mexican dollars, 95.

LONDON Consols 94 12 1/2; Bonds, 105 1/2.

QUICKSILVER IN S. F., by the flask, 43 @ 45 1/2.

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[Under the Revised Act of Congress, which took effect August 1st, 1874.]

No copyright is valid unless notice is given by inserting in every copy published, on the title page or the page following, if it be a book; or, if a map, chart, musical composition, print, cut, engraving, photograph, painting, drawing, chromo, statue, statuette, or model or design intended to be perfected as a work of the fine arts, by inscribing upon some portion thereof, or on the substance on which the same is mounted, the following words, viz: "Entered according to the act of Congress, in the year _____, by _____, in the office of the Librarian of Congress, at Washington;" or, at the option of the person entering the copyright, the words: "Copyright, 18____ by _____."

The law imposes a penalty of \$100 upon any person who has not obtained copyright who shall insert the notice "Entered according to act of Congress," or "Copyright," etc., or words of the same import, in or upon any book or other article.

Each copyright secures the exclusive right of publishing the book or article copyrighted for the term of 25 years. Six months before the end of that time, the author of design, or his widow or children, may secure a renewal for the further term of 14 years, making 42 years in all. Applications for renewal must be accompanied by explicit statement of ownership, in the case of the author, or of relationship, in the case of his heirs, and must state definitely the date and place of entry of the original copyright.

[Our terms for securing a copyright certificate is \$5, including the Government fee.]

[Our terms for securing certificate of registration for a label is \$16, including Government fee.]

Copyrights cannot be granted upon trademarks, nor upon labels intended to be used with any article of manufacture. If protection for such prints or labels is desired, application must be made to the Patent Office, where they are registered at a fee of \$8 for labels and \$25 for trademarks.

Applicants for the registration of trademarks must file the following papers in the Patent office, to wit:

1. A specification fully describing the trademark.

2. A petition by the party or firm.

3. An oath by some member of the firm, if it be a firm; otherwise by the owner.

[Our terms for securing the registration of a trademark (issued in the form of a patent) is \$40, including Government fees.]

If you have a label which you desire to protect against imitation, you can have this done by complying with the following rules, viz:

1. Send us six copies of the label, and full name of proprietor.

2. State the class of goods to be protected; and give a brief description of your business.

For further information concerning the above, U. S. and Foreign Patents, Caveats and general patent soliciting business, address

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THE CLIMATE OF CALIFORNIA.

A thoroughly studied and ably written treatise on this subject by Hon. B. B. Redding, appears complete in the PACIFIC RURAL PRESS for January 26th, and also the MINING AND SCIENTIFIC PRESS. Based upon facts, figures and careful and extensive observations made in various parts of the State on this important subject, it is a volume of reliable information, interesting to every resident of the State. The information is condensed in a paper read before the California Academy of Sciences, and is published in the Press as read before that Society without any alterations or omissions. Extra copies, post-paid, 10 cents. Address DEWEY & CO., Publishers, 202 Sansome Street, San Francisco.

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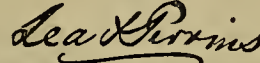


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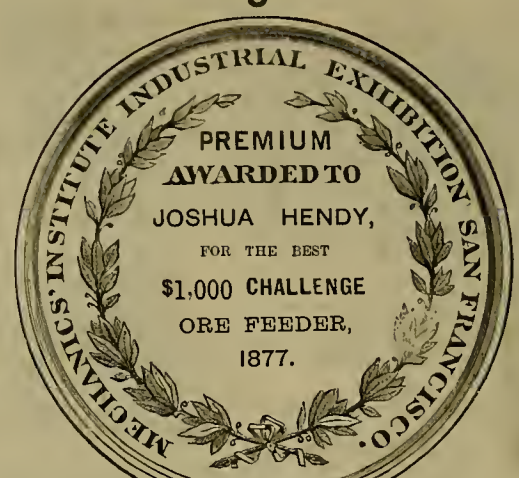
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HENDY'S \$1,000 CHALLENGE ORE FEEDER.

I call my Automatic Ore Feeder the \$1,000 Challenge, because I challenge the owners or backers of any other feeder to a competitive test for that amount. As Mr. C. G. Rodgers, Superintendent of the Green Mountain mine, near Greenville, Plumas county, appears prominently as a detractor of the merits of my feeder, and seems confident that another one is better, perhaps he will accept this long-standing challenge which the owners of other patents will not, and give me an opportunity to prove publicly the superiority of my machine. As to Mr. Rodgers' assertion about my feeder wearing out, it is no less fallible in that respect than other machinery; but I have over 250 now in use, some of them for over two years, and have never had to expend 25 cents for repairs. The fact that my feeder received the premium at the late Mechanics' fair, and that I am shipping several feeders weekly to different parts of the country, is sufficient proof of the appreciation in which it is held.

As to my feeders having been thrown out of the Gold Stripo mill, they were not displaced for inefficiency, as the following letter will show, and it answers also as a complete refutation of Mr. Rodgers' statement:

OFFICE SUPERINTENDENT OF THE GOLD STRIPO G. M. CO., }
GREENVILLE, PLUMAS CO., Oct. 16th, 1877. }

JOSHUA HENDY, Esq.—Dear Sir:—Your favor of the 15th instant at hand. In reply to your inquiry as to the working of your ore feeders at our mill, we can say that there is no fault in the machines, and we consider them the best now in use. At present they are not in use with us, owing to the construction of the mill, which we are about to rebuild and make proper arrangements for putting in your feeders.

J. K. OWEN,
Superintendent Gold Stripo Mine.

One of the principal owners of the Gold Stripo and Green Mountain mills is also largely interested in the Plumas National mine, where I have just shipped several feeders, showing the confidence placed in the machine by these gentlemen who have used it.

Now, if Mr. Rodgers is sincere in his belief as to the merits of a rival machine over mine, here is a chance for him to make a thousand dollars easily, if he can get the owners of the machine to lend him one for the trial, which is the only doubtful thing in connection with the matter. Mr. Rodgers' eight months' experience with both machine ought to give him confidence enough in his own convictions to accept the challenge offered to him, or any one else.

JOSHUA HENDY.

Corner Fremont and Market Streets, San Francisco.

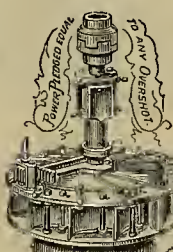
It may be considered as now fully demonstrated, by careful and long-continued experimentation, that the plan upon which a perfect ore feeder must be constructed is that of the carrier, and not that of the shaking table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Spasmodic or jerky contrivances will not answer the purpose.

We warrant the machines to give perfect satisfaction, and to be a better and more durable Feeder than any other the market, and will sell them as cheap as any other of its class.

ENDORSED BY THE FOLLOWING PARTIES:

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Jet, 13c. CLINTON BROS., Clintonville, Tenn.

Howell's Improved White Roasting Furnace.

This cut represents the most improved construction of this unrivaled Furnace, the superiority of which over all others as regards cost and capacity, as well as the economical and thorough oxidization and chloridization of ore, is now generally conceded.

In this Furnace, as covered by the Howell and White patents, are combined the three acknowledged requisites for the thorough and economical roasting and chloridization of ores.

First.—Continuous progression through and discharge of the ores from the furnace—while in the meantime they are, by being constantly showered through the heated air and gases within it, exposed in the greatest possible degrees to their reducing action.

Second.—Subjecting the ores to this showering process any length of time that may be necessary, according to the character of the ore, for its thorough reduction. In passing through the furnace it ordinarily falls about 1,000 feet, all the time in direct contact with the flame.

Third.—Increasing the heat on the ores as they are progressed through the furnace.

In this respect this furnace excels all others, as none of them combine all these essential requisites. It will chloridize the most refractory ores up to from 80% to 95% of their assay value, depending upon their nature and grade.

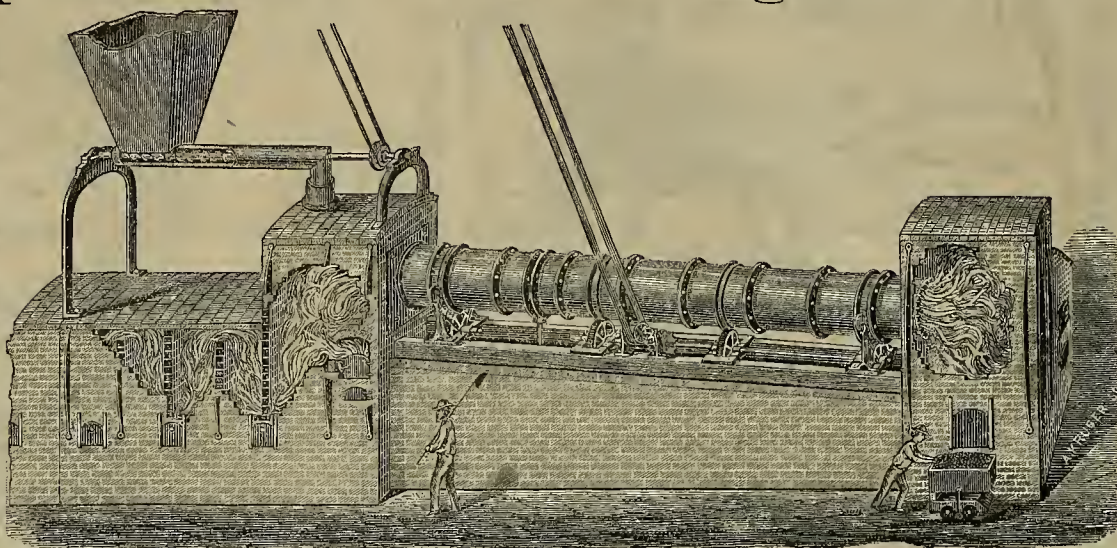
The first cost as well as the cost of operating it is less than that of any other furnace of equal capacity.

It requires no especial skill in management that cannot be readily acquired by any one capable of conducting an ordinary silver mill.

We manufacture various sizes adapted to a five, ten or twenty-stamp mill, and furnish plans by which any competent mill man can erect and operate it.

This furnace having the full or partial brick lined cylinder, embraces the devices covered by the patent to John Howell, as well as the original devices covered by the White patents, has been erected and operated successfully at the following mines in California, Nevada, Arizona and Montana: Camanche, Jefferson, Leopard, Utah, Star, Navajo, Grand Prize, Peck, Tiptop, Hackberry, Independence, Endowment and Alice. At least ten of them are now in active and successful operation, in some cases reducing ores of the most refractory character.

These facts are a sufficient attestation of the merits of this furnace.



The undersigned, with Mr. John Howell, are the sole owners of the Howell patent, and they have perfected arrangements with him, and also with Mr. James M. Thompson, who is a large owner in the White patent, and as such is possessed of as full and perfect rights and powers under the same as the patentee himself, by which they have acquired the exclusive right to manufacture these furnaces for the Pacific States and Territories. We hereby caution all parties against purchasing the same from any others but ourselves, or the said Howell or Thompson, as we shall prosecute all parties infringing upon the same. For particulars, price and terms, address

RANKIN, BRAYTON & CO.,

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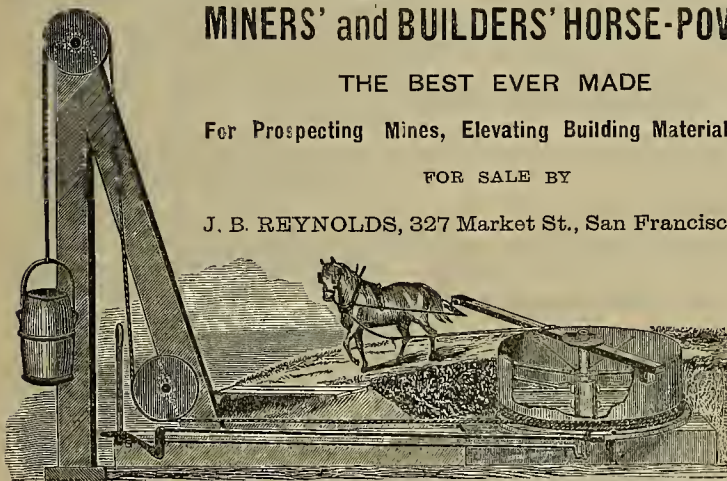
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BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, MAY 11, 1878.

VOLUME XXXVI.
Number 19.

Harris' Fruit Drier.

We illustrate on this page a fruit drier patented some time since through the MINING AND SCIENTIFIC PRESS Patent Agency, by Geo. Harris, 33 Second st., this city. The heater is constructed in a novel manner, so that a thin body of water or air is in contact with the heating surface, and the fuel can be utilized to the utmost, the hot air being conveyed through the drying chamber in pipes to assist in the drying, and the condensed water being used to replenish the boiler. The arrangement of the heater is such that it gives the most favorable heating with the smallest amount of fuel.

The heater is filled with water, and from its shape, when a fire is made in the fireplace, a thin stratum of water will be rapidly heated, and a very visible circulation will take place, so that in a short time the whole body of water will be brought to a boiling point. As the heater tank is made of wood, it will retain the heat with little reduction for a long time, and the radiation is so small that the heat can be easily kept up with a small quantity of fuel.

By surrounding the fireplace with a stratum of air between it and the water, the air is also heated, and not only transmits its heat to the water, but is also prevented from being burnt by any amount of heat from the fireplace. This is one of the important features of the machine, because there is never any danger of burning and spoiling the substance to be dried by too fierce a heat or by neglect.

The air circulates freely and in such a volume as to carry off the moisture from the drying room with great rapidity through the pipe, which connects with the escape flue, and it is assisted materially in this by the steam pipes from the heater tank. The trays being filled with fruit at night a fire is built, and the whole apparatus may be safely left over night without the slightest danger of fire or of spoiling the articles to be dried, because the combination renders it impossible to elevate the temperature of the air much beyond that of the water in the tank.

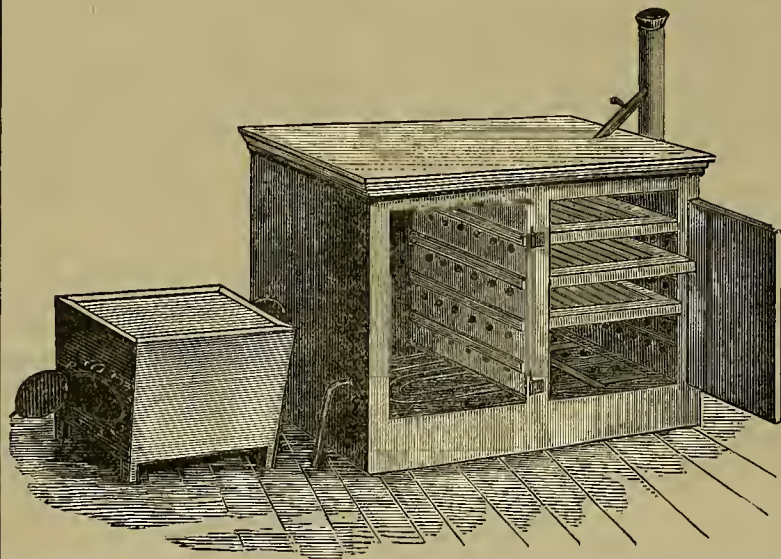
There are open flues on both sides of the drier for the admission of the heated air, and glass doors are provided by which light is admitted to the fruit which is in the process of drying. With grapes, particularly, this is a most important feature, as it is also with many other kinds of fruit. The trays on which the fruit is to be placed in the compartments, are made of slats, so that the hot air may circulate freely in every direction and get at the fruit on all sides.

These driers are made of various sizes at prices from \$75 to \$600, and several different kinds of fruit may be dried at the same operation without the flavor of one kind permeating the other. This is accomplished by having several compartments, in each of which a different kind of fruit may be treated. This makes really a separate drier for each kind of fruit, all in one machine. In some cases it is considered essential to cook the fruit before drying. In this machine the fruit or vegetables may be placed on the racks and cooked by the steam over the heater, and then be placed on the same racks inside of the drier. It is claimed that the fruit dried by this process is much superior to that treated by any other process in use.

Premiums have been awarded to this apparatus at every fair where it has been exhibited, including that of the Mechanics' Institute in this city last year. After 10 years use of the drier, several persons who have used it say there is no fault which they can find with it whatever. Farmers who have only a small quantity of fruit to dry may prepare it with one of these driers at small expense and little trouble. The heaters attached to it may be also used, with a slight variation, separate from the drier, for laundry purposes. From 30 to 40 gallons of water may be heated in 20 minutes. Over 200 of these heaters alone have been sold to dairy and milkmen, and have given gratifying results. It has also been applied to public and private baths. These heaters cost from \$15 to \$75 according to size and material. The experience from purchasers having them long in use, is that the saving of fuel alone in from three to

four months is sufficient to offset the cost of the heater. Chas. M. Hawes and Mr. Raymond, milkmen in the Potrero, are using the heaters for cooking barley for their cows, and say that they save from \$1.50 to \$2 a month per cow, having previously fed them barley from the brewery. The manufacturers of this apparatus are Harris & Bradley, 33 Second st., in this city.

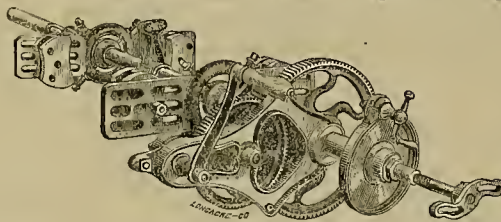
ILLNESS OF DR. DIO LEWIS.—We learn with deep concern of the illness of Dr. Dio Lewis. He was taken with congestion of the brain and slight paralysis of the side (as it is described in the certificate signed by three physicians), just as his camping expedition was in starting. The illness was probably the result of over-exertion



HARRIS' PATENT FRUIT DRIER.

in the promotion of the camping enterprise. The campers have proceeded on their way fully equipped. The camp, as we saw it last Saturday, presented a picturesque appearance, and with its many appointments, gave one the impression of extent and completeness. The expedition goes forward with Mr. Hopkins as conductor of the train, and Mr. Ayres as teamster. Professor Lemmon superintends the scholastic element, research being mainly directed to his specialty of botany.

ITACOLUMITE.—Mr. J. S. Phillips, M. E., has received for assay and examination a num-



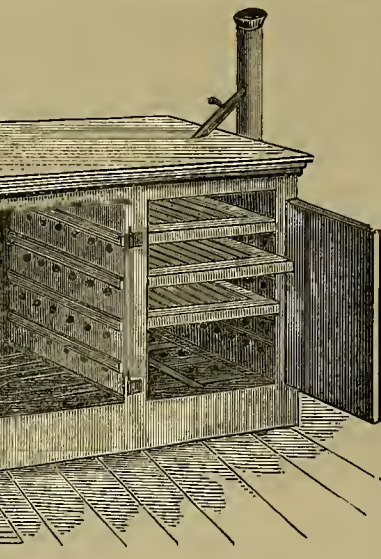
FLANDER'S LOCOMOTIVE CYLINDER BORING MACHINE.

ber of samples of rock from Victoria, B. C., forwarded from various mines. Among them are several specimens showing itacolumite formation. In and around such rocks diamonds and other precious stones are usually found, and this is the first instance of which we have heard of its being noticed on this coast. No diamonds have been discovered that we know of, or have they been sought for in that country, although the formation is such as would lead a mineralogist to suppose them present.

PROF. BECKER, of the University of California, will leave for Paris on the 18th inst. He will remain during the continuance of the expedition, and will then return to this State.

Locomotive Cylinder Boring Machine.

We illustrate herewith Flanders' improved locomotive cylinder boring machine, having a bar and screw of cast-steel with two extra cutter beads. It is especially adapted to boring out locomotive cylinders and driving boxes in their places by removing only one or both heads and piston. The back-head, cross-head, or slides, need not be removed unless so desired. On removing the piston and leaving the front-head and stuffing-box, a small cone takes the place of the stuffing-box at once, and with proper adjustment at the front-head is ready for work. This machine is fed with a constant



feed of cut-gears. The clamps, or cross-heads, are so arranged that they may be used conveniently on locomotive cylinders of all sizes, which is a great improvement over the old machine. The firm also manufacture bars for boring stationary and marine engine cylinders from 10 to 110 inches in diameter. These machines are very complete, doing a satisfactory job with great saving of time, and are used quite extensively in Philadelphia, New York and Pittsburg, boring out the cylinders of steamships while the cargoes are being unloaded in a rapid and satisfactory manner. They can be used with great advantage by mining com-

Academy of Sciences.

A regular semi-monthly meeting of the California Academy of Sciences was held on Monday last, Vice-President Henry Edwards in the Chair.

Professor John Le Conte, President of the University of California, was proposed for membership, as was W. B. Rising, Professor of Chemistry at the University. Mr. Jay C. Kelly was also proposed.

A number of mineral specimens were presented to the Cabinet from C. W. Crane, J. B. Haggin, B. B. Minor, Thomas Price, Dr. E. L. Willard, and the Ventura Rock Soap Company. A curious pair of deer horns, showing abnormal growth, were presented by R. S. Floyd.

A paper by Professor George Davidson was read by Mr. Christie, entitled a "A Forward Movement in Astronomy," referring to the proposition to change the location of the United States Naval Observatory at Washington to one more favorable to the health of observers, and also for obtaining better conditions for observing. The paper referred to discussions on the propositions by astronomers and cited authorities to prove that high elevations were most favorable for observation.

A dispatch was read by the President from Mr. Colonna, of the Coast Survey party, observing the transit of Mercury at Summit, California, stating that the transit was observed completely by the Coast Survey party.

Mr. W. N. Lockington read a paper entitled "Remarks upon the Star Fishes and Serpents of the Pacific Coast."

Mr. Edwards introduced to the Academy Rev. Dr. Bleasdale, of Melbourne, an eminent Australian scientist. The gentleman addressed the Academy on the subject of the necessity of making science popular, and the method by which this was being done in Australia. He spoke of the museum at the University at Melbourne, which had cost £64,000 up to the present time. This museum embraces in its scope, not only articles of scientific interest, but all such things as were being utilized in the country. By this means, all persons visiting the collection are able to see at a glance, the products of the country, the machinery by which it is worked up, the character of the soils, etc. All these things are labeled, so that no questions have to be asked by strangers, everything being clearly explained. He suggested that the Academy might extend its collection in the same manner, so as to popularize science, and be of great practical benefit to the community.

Several members of the Academy spoke in favor of collecting the useful products of the country, which might be labeled so as to give information on all sorts of subjects to persons in need of it. Considerable discussion ensued on the subject of the popularization of science, and the best methods of doing it.

Mr. Henry Edwards exhibited caterpillars from Acapulco, which had been infested by parasites. He had had the specimen three weeks, and it was the first instance he had seen of the caterpillar surviving the attacks of the parasites.

RAILROAD GAZETTEER.—This popular handbook of railway time tables, filled with entertaining literature, is widely circulated among the traveling public, and is freely read and consulted. Mr. Bean, the compiler, can now claim the fullest existing schedule of notes of travel, modes of conveyance, distances and rates of fare from San Francisco to all the towns on the Pacific coast. This schedule occupies 20 pages of the magazine, and should be kept for reference by everyone. It will save a world of inquiry when one wishes to know the distance and method of reaching any point on the coast. The *Gazetteer* is well patronized by advertisers. H. S. Crocker & Co., 401 Sansome street, are the publishers.

The famine now prevailing in the northern provinces of China, and which must continue at least six months longer, is being marked by fearful horrors. In one town a man opened a shop for the sale of human flesh, and did a good business in cannibalistic joints and roasts till the local Mandarin caused the shopkeeper to be arrested and beheaded.

MR. L. SAMUELS, publisher of the *West Shore*, at Portland, Oregon, lately spent several days in San Francisco in the interest of his enterprising illustrated monthly. He intends soon to issue it weekly.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Esmeralda District—No. 1.

An Account of Its Early History and New Departure.

Outside of the Comstock there was no excitement in the early days of quartz mining east of the Sierras, so intense and promising as that of Esmeralda, and no collapse was comparatively so complete. Deep mining was a new thing, however, and only a few bold operators, headed chiefly by the late Wm. C. Ralston, felt equal to the occasion, and they centered their capital and labor upon the general market supplies and the line of general travel—the Washoe district. Esmeralda was practically abandoned about the time the surface deposits of the Comstock were exhausted, 1864. The first quartz discovery in Esmeralda occurred on August 22d, 1860; claims were located on the 24th, and on the 30th an organization effected and recorder elected. This was brought about by three prospectors who crossed over from Mono county, California, named Jas. M. Brady, J. C. Cory and E. R. Hicks. The two former are residing in Santa Clara county, California, but nothing is known of the whereabouts of Hicks, who started for "the States" soon after the excitement, which enabled him to dispose of his interests for the sum of about \$10,000. Cory and Hicks remained longer, took considerable part in the unsystematic scramble on Last Chance, Middle and Silver Hills, realizing over \$30,000 each, and retiring to more peaceful pursuits. Cory is a well-to-do farmer, and Brady is nicely located in San Jose as a real estate and money broker.

The excitement did not culminate in Aurora before 1863, when there was a fighting, scheming population there of from 5,000 to 8,000. A good style of town was built, the specimens of brick structure yet remaining, to say nothing of the ruins of brick and mortar on every hand for miles along the leading ravine, giving ample evidence of that fact. Although Bodie was a prior discovery, it created to particular attention; built no town to speak of up to the time of the beginning of the present era, which is all new. Aurora, or rather the word Esmeralda, was in everybody's mouth, and the wild cat, as well as the tame, went off like hot cakes with golden syrup. There were nearly a dozen quartz mills erected, three of which were large brick structures, costing from \$150,000 to a quarter of a million dollars apiece, only one of which remains anything like intact, the rest being dragged away to other fields. A dime novel at least could be founded upon the blood-and-thunder facts incident to the days of '63-4, to say nothing of the ignorance of mining there displayed and the great amount of accompanying extravagance. Several duels, according to the code, were fought; desperadoes revelled in deeds of blood, four of whom ended their career simultaneously upon the same scaffold erected by the people and in full presence of the people, who rose in their might and drove the roughs by scores to other scenes, apparently sending the "Inck" of the place after them. This occurred in February, '64, and for fourteen years afterwards shares or "feet" in Del Monte, Wide West or Antelope, were at first a drug, then a stench in the nostrils of holders, or lastly of an unknown quantity with dealers of all kinds. Yet it seems hard to believe that such a state of things could ever come of so wonderful a belt of rich mineral-bearing quartz as that which is just now attracting renewed attention on the part of the heaviest and most experienced operators and mining men. Doubtless the great and expensive depths to which the Comstock claims have been worked in connection with the mere scratches on the surface of the almost better defined and richer croppings at Aurora, have had something considerable to do with this sudden widening of the circle of extensive enterprises, of which the new Del Monte shaft must be but the entering wedge of a series of the like order of works of development in this singularly long neglected district. Real estate has become valuable again in Aurora, houses that sold for taxes last year are now held at high figures, comparatively, and expectation is accordingly inspired. It may require a year to determine whether there is any real cause for all this change of heart, and it may not be demonstrated even then, but that there is an abiding faith on the part of all who have looked over the ground to the end of a second excitement in Aurora that will eclipse the first in importance and permanence, it is useless to dispute. It seems to possess more than usual significance, too, at the present juncture of affairs, when there are no new worlds to conquer, and Washoe stocks are generally under the control of one house, and becoming more so all the time. Perhaps in another article it can be set forth more satisfactorily as to leading details concerning the history of Esmeralda. J. W.

TRANSPARENT CEMENT.—The curd of milk precipitated by acetic acid, washed in clean water, and dissolved in a cold saturated solution of borax, is recommended by a continental contemporary as an excellent cement of perfect transparency.

New Tellurium Ores.

From the work of Dr. Genth who first studied and published the newly discovered ores of this element as well as well-known varieties first discovered in Colorado, the *Engineering and Mining Journal* quotes the following:

Native tellurium from mines of Keystone and Mountain Lion in Magnolia district. One variety, which appears in thin leaves with the ores, and is accompanied by a (peculiar green) mineral containing vanadium. It showed the following composition, with the exception of quartz:

Gold	0.00%
Silver	0.07%
Tellurium	96.91%
Sesquioxide of Vanadium, V_2O_3	0.49%
Sesquioxide of Iron	0.78%
Quicksilver, Alumina, Magnesia, Potassium	1.15%

Dr. Genth ascribes the presence of gold, silver, quicksilver and iron to mixtures of calaverite, coloradoite and iron pyrites, which are so dispersed through the ore as not to be separated mechanically. Another variety was discovered by Thos. Berdell in the Mountain Lion mine. These form flat, table-like discs, are grayish dull, have a column-like structure (cutting the tables at right angles), and in appearance not unlike sheet iron. Even under the lens it appears homogeneous, and accordingly Dr. Genth held it for a variety only and not a new species. The analysis gave:

Gold	1.38%
Tellurium	55.86%
Alumina	6.15%
Ferric Oxide	0.48%
Lime	0.25%
Silver	34.72%
Silico	0.17%
Magnesia	99.01%

Coloradoite (telluride of mercury) amorphous, without cleavage, compact, a little granular; fracture, uneven to hackly; hardness, 3 about; specific gravity, 8.627; metallic luster; color, iron black, with a cast of gray and a little tinge of red; commonly showing a play of colors (red, blue and green). In the closed tube it decrepitates, melts and gives an abundant sublimate of metallic mercury, drops of telluric acid, and near the assay metallic tellurium. On charcoal it gives a green flame and a white incrustation. It is soluble in nitric acid. As it was difficult to procure pure pieces for analysis, Genth still holds that the composition corresponds to the formula, Hg_2Te analogous to cinabar and trematite, consequently it should contain 60.98% mercury and 39.02% tellurium. Samples from Keystone and Smuggler mines gave the following results:

	SMUGGLER.	KEYSTONE.
After subtracting quartz and gold	6.36	46.83
Mercury	55.80	52.28
Silver	2.42	0.00
Copper	trace	0.00
Zinc	trace	0.00
Iron	1.35	2.44
Tellurium	80.24	42.95
Vanadium sesquioxide	0.00	0.70
Magnesia	0.00	0.11
Lime	0.00	0.84
Alkalis	0.00	0.00
	55.81	99.32

The composition of calaverite from the Keystone corresponds, according to Genth, to the formula ($\frac{2}{3}Au, \frac{1}{3}Ag$) Te_2

Gold	39.01%
Silver	3.06%
Tellurium	57.93%

Tellurite (telluric acid) found in cracks of the native tellurium as a yellowish white, white and yellow small prismatic crystals.

Magnetite is a new mineral found in the upper levels of the Keystone mine, and must be regarded as a product of the decomposition of Coloradoite. It forms fine needles of white color, with silky luster, which are often grouped in tufts about a little ball of quicksilver. Its composition corresponds to the formula, Hg_2TeO_4

Ferrotellurite forms a crystalline incrustation upon quartz, associated with native tellurium. Its composition corresponds probably to the formula, $FeTeO_4$. A preliminary analysis gave:

Iron	41.01%
Nickel	0.72%
Tellurium	4.06%
Sulphur	41.73%
	87.52%
	or 12.48% remainder

Estimated as oxygen. The specimen analyzed was not the pure mineral.

The cultivation of the peculiar green quartz, which always accompanies the tellurium ores was not according to Dr. Genth due to the latter, but to a silicate like roselite, containing vanadium.

Mining Around Auburn.

From the *Placer Herald* we clip the following in relation to mining operations in that vicinity: At the Centennial mine on Duncan Hill, a force of men are running a tunnel calculated to tap the ledge at a depth of several hundred feet, and afford, besides drainage, a convenient means of working the mine. The length of the tunnel will be about 500 feet, of which 160 is completed. Messrs. Spring & Holcom are working a new quartz ledge near the Eclipse mill, and though they are as yet down but a little way, they have a very encouraging prospect. Simons and Polster are also taking out some very fair rock from

a ledge on North ravine. The Good Friday, on which little has been done lately, has been started up by the Werry brothers. Mr. Hooper has recently leased the Shoo Fly ledge and is working it with good results. The Osborn brothers are at work on an extension of the Shoo Fly, getting a good prospect. The Trembling brothers have a shaft down near the old Bellevue mine, and by means of a whim are hoisting some good ore. On north and other ravines in the vicinity considerable sluice mining is being done during the present abundant water supply, and in most cases the miners in this line are getting fair wages at least. Chinamen with their pans, rockers or sluices can at present be found in nearly every little gulch in the hills; with free water these fellows can scratch out Chinese wages almost anywhere. Even in the little ravine on Nevada street, just at the edge of town, a Chinaman with pick and pan has been crevicing around for the last week or two, and it is not to be supposed he would stay there so long unless he found something. At various points on Auburn and Dutch ravines several gangs of Chinamen, consisting of from 10 to 15 each, are at work sluicing, though with what results cannot be ascertained, as whether good or bad, they always say "no belly good."

The Great Lead Deposit in Colorado.

The excitement of the day in Denver, and, indeed, in the entire State of Colorado, is the enormously rich deposit of argentiferous lead ore—chiefly carbonate of lead—in California Gulch, or Leadville, as the camp is now designated. This remarkable mineral deposit is certainly one of the most important yet discovered in this country. In some places the carbonate of lead containing from 10 to more than 1,000 ounces of silver to the ton, is dug up as sand, a sand which has long been known to prospectors, but, like the black silver ore of Lake Superior, was not recognized as of value till recently. Now the mountains, though covered with snow, are dotted everywhere in the vicinity of Leadville with indefatigable prospectors, some five or six hundred of whom have collected there from all parts of the country. The ores are very peculiar in appearance, some of them resembling iron ore, and they are found in some places in great abundance. Massive beds, as great as 20 feet in thickness, being already opened, and it is claimed that ore containing from 30 to 100 ounces of silver and a high percentage of lead can be mined and delivered "at grass" for \$3 a ton.

We gave in our number of January 13th a detailed description of these deposits. Their geological character is attracting much attention, and, as is invariably the case with very valuable mining property, they have fallen among—the lawyers.

The prevailing opinion is that the deposit resembles in many of its features the great Eureka-Richmond lode in Nevada, and that the recent decision, in which it was maintained that the whole mineral-bearing bed constitutes the lode, may be applied to this case. Though the lead thus far found has been as a contact deposit between porphyry and limestone, the correspondence referred to above classes them as sedimentary beds, of the nature of hog iron ore. The suits already in the hands of the lawyers will, no doubt, call for the best expert testimony that can be obtained, and there is a fair prospect that they will lead to full enlightenment of a most interesting geological question, and whatever these mines may prove to the miners, they will certainly prove a very "bonanza" to the lawyers.—*Engineering and Mining Journal*.

REMEDY FOR OBESITY.—According to Dr. Philbert, the waters of Brides in Savoy, which are very similar to those of Carlsbad, are very useful in the treatment of obesity. The purgative salts contained in these waters are sulphate of soda, chloride of sodium, chloride of magnesium, sulphate of magnesia, and sulphate of lime. To increase the effect, from 15 to 80 grains of sulphate of soda are added to each glass of mineral water. The quantity taken daily is four-fifths of a quart, divided into three doses, and the purgative effect is produced in two or three days. The course may last from four to six weeks. As an adjuvant to the waters, a vapor bath may be taken every day or every second day. Fermentaceous and saccharine articles of food are not allowed, and brandy, liquors, and coffee are interdicted; but the quantity of food is not limited, and a moderate amount of wine may be taken without harm. Muscular exercise is considered indispensable, and the mountains in the vicinity of Brides afford every facility for walking, where, in addition, this treatment may be followed by the grape cure.

THE GERRISH SMELTER.—This new style of furnace, lately erected by the Eureka Con. Co. is described by the *Sentinel*, as being provided with an air-jacket, precisely like a water-jacket, except that air is issued instead of water, and the inner lining, next the fire, is copper. That copper will not melt inside of a furnace was discovered by accident in New Mexico, and by a similar accident it was demonstrated that air was better than water for keeping the furnace from burning. The furnace now in process of construction is intended to reduce 24 tons of ore per day, and will fire up about the 1st of May.

Accountability for Mine Mismanagement.

Under this caption the New York *Mining Record* of recent date discourses as follows: The time has gone, by when men holding positions of high trust can be guilty of malversation or robbery, and not suffer the penalty, equally at least, with the lesser criminal whose open theft is less dangerous to the community, both as to degree and opportunity. In the city of New York, and throughout the State, recent judicial proceedings have shown that men holding high places and positions in politics and finance, whose real business was covert stealing, could be passed from the prisoner's dock to the State Prison or penitentiary as readily as the pickpocket, by vigorous and determined prosecutions which met with the approval of the community, courts and juries. Civil remedies were also applied to recover the stolen funds, and, if insufficient, were at once supplemented by stringent enactments to meet the need. There is no reason why California justice should be less efficient or prompt. Her people are noted for their manhood and fairness, which are none the less in her present organized condition of society than in her years of infancy, when her sparse and adventurous population respected mere signs of unprotected ownership, and Judge Lynch, by common consent and social necessity, adjudged the case of every thief.

It is of the highest importance for California, that the great mining interests which there take their germ should have the confidence and consequent facilities of the great financial and stock exchanges of the country and of the world. The recent establishment of a Mining Exchange in the city of New York is a sign of development of California in this branch of economy. But the financial and mining community of California cannot expect to command such confidence and facilities abroad, if the hideous misdoings of the mine directors and stock operators of that country, as we find them reported in their own journals, are to be suffered to pass without both punishment and enforced restitution. Criminal proceedings should at once be instituted, and stop only at the prison bars, while at the same time, civil proceedings should be had, accompanied by attachment of property, to recover for the stockholders the money extorted from them, under the name of assessments. It is shocking that in the case of the Justice mine, while it was producing large amounts, repeated assessments of money were levied on the stockholders, amounting in less than a year to nearly the present market value of the stock, and immediately diverted to the pockets of a few thieving scamps in their character of trustees!

All that is needed to promptly redress such wrongs is for the proper authority to take the initiative in a vigorous prosecution, and, if perchance through any clandestine alliances there should be an official stumbling block in the way, let public opinion, manifested through the action of individuals and the press, sweep the obstacle before it, as in the hurricane of the Tweed-ring prosecution here. It must be expected that such evil doers will have a certain amount of support, some from interest, either open or covert, others the mere stupid gazers who, from not being rich themselves, like to look at the riot of such wealth, and nurse the vague notion that some day they also may be drifted or tossed into it.

But the masses and the better portion of the community have everything to gain by the course we recommend; and whatever the prestige of the malefactor, it will fall to the earth the moment he stands unceremoniously arraigned at the bar of justice as any other thief, and the rest will prove as easy, if not easier, than the conviction of any less notorious and less grievous criminal. California owes a duty to herself in this matter, and we shall be disappointed if she fails of its prompt and energetic performance.

INCREASED LEAD PRODUCTION IN THE UNITED STATES.—One material result of the silver mining in Colorado, Nevada, Utah and Montana, has been to make this country the chief producer of lead as well as silver and gold. Up to 1876, the annual lead product of the United States ranged between 15,000 and 20,000 tons, chiefly from Illinois and Missouri—consumed for the most part westward of the Alleghenies—and consequently we were large importers of lead from England. But since 1873, the argentiferous lead ores of Colorado, Utah and Nevada, have turned out in 1874, about 20,000 tons of lead, 31,200 in 1875, 33,630 tons in 1876, and in 1877, about 45,000 tons with an increased production in Missouri and Kansas, to such extent that the lead product in 1877, is estimated at 73,000 tons. The price of lead was 8 cents in 1873, but at present it is about 4 cents. At 33 cents, exportations will be profitable, and in any event we ought to be able to monopolize the large China market.

"OIL SMELLERS."—They have "oil smellers" in the oil regions who profess to be able to detect the existence of petroleum 1,000 or 1,500 feet below the surface, by suspending an hermetically sealed bottle from a string close to the ground. One wealthy operator, referred to by the *Titusville Herald*, was fascinated last year by this species of locus ponens, to the extent of \$100,000 worth of dry holes.

MECHANICAL PROGRESS.

Locomotive vs. Horse Power.

An inquiry of no little interest is followed by Edward Appleton in a paper recently read before the Boston Society of Civil Engineers. He cited authorities by which a comparative estimate of locomotive and horse power can be made. A nominal horse power is that necessary to raise 33,000 lbs., one foot high per minute; an estimate first made by Boulton & Watt in selling their steam engines. Trautwine says that his assumption can really be carried out by a strong horse day after day for eight or ten hours; but as an engine can work day and night without stopping, while a horse cannot, a one-horse engine can do much more work than any one horse. Boulton & Watt meant that their one-horse engine could at any moment perform the work of a very strong horse.

Trautwine estimates that a good, average trained horse, weighing about half a ton, well fed and treated, can walk 10 hours per day at the rate of 2½ miles per hour on a good level road, and exert a continuous pull or tractive force of 100 lbs. On a level piece of good road, he estimates the traction at 60 lbs. per ton of load and carriage; so that the 100 lbs. of tractive force exerted by the average horse enables him to pull a load of 1½ tons at the rate of 2½ miles per hour for 10 hours per day on a good level road.

Trautwine gives the weight of a train, exclusive of engine and tender, which a good locomotive weighing 27 tons or 60,480 lbs., all on the drivers, can haul on a level railroad, at a moderate speed, say 8 to 12 miles per hour, as 1,458 tons, an estimate corresponding very nearly with the amount of work which the Baldwin Company guarantee their locomotives of similar size to perform. This locomotive then will haul a load as heavy as 878 horses could pull at the rate of speed assumed above for them on good common roads; but as it hauls this load at an average speed of four times that of horses, it is doing the work of 3,512 horses and is capable of doing it, not merely for 10 hours per day, but for nearly the whole 24. If the horses, however, were hauling upon a level railroad instead of a common road, it would not require so many of them to do the same work. Haswell gives a table of the comparative useful effect of the power of an average horse on a turnpike, a railroad and a canal. He rates the tractive force of the horse at 83.3 lbs., and says that a horse, traveling at the rate of 2½ miles per hour for 11½ hours per day, will exert a useful effect equal to 14 tons drawn one mile on a turnpike, 115 tons on a railroad and 520 tons on a canal. Making the hours of work and the tractive force agree with those of Trautwine, the average horse would draw 110 tons one mile on the railroad, or for his whole distance of 25 miles in 10 hours, he would draw 4 and four tenths tons. The locomotive above described then draws as many tons as 331½ horses could pull on the same railroad; and as it draws them at four times the speed of the horses, it does as much work in the same time as 1,325 horses.

A NEW FRENCH BALLOON.—The construction of a monster captive balloon at the Tuileries is said to be attracting much attention in Paris. A large wooden saloon has been erected for the sewing of the canvas, which is quite ready; not less than 100 girls will be required for about a month. The work of making the rope, which is almost finished, has been immense. The weight of the netting will be 3,000 kilograms, more than the displacement of the largest balloon in use. Besides the netting, the other ropes connecting the car, etc., will weigh 2,000 kilograms, and the large rope for mooring the balloon to the steam winding apparatus will be 3,000 kilograms. Experiments will be made to show that the rope can bear a traction of 50,000 kilograms, although it is not intended to ascend when the effort to move the balloon will exceed 12,000 kilograms. The real steam-power required will be 300 horse-power. The displacement of the balloon will vary according to its station; on the ground it will be 24,430 cubic meters, but floating at 600 meters in the air it will be 25,000.

ON THE USE OF EMERY WHEELS.—In an English lecture on emery wheels the following paragraph is found: A common delusion prevails that an emery wheel is a tool requiring neither skill nor practice, and it is left to any one who chooses to work it. The result of this same system, as applied to grindstones, has caused that article to assume the simply disgraceful appearance it often exhibits, untrue, worn into grooves and hollows, no one responsible for keeping it right, and the result utterly wrong. This system pursued with emery wheels is simply fatal to their chance of success. Mount an emery wheel on a suitable machine on a rigid foundation (do not put a heavy wheel on a light spindle), run it at proper speed, checking the calculation with a speed counter, keep it always absolutely true with the diamond (a tool not half used), press the work lightly on to the wheel—“crowding the work,” as it is called, heating more and doing less than gentle pressure; appoint a careful man to use it, and make him responsible for its condition, allow him a reasonable time to learn and understand a new tool, and one possessing very great and unusual power, and the result cannot fail to be satisfaction of

the very highest degree. But set an ignorant or prejudiced mechanic to a badly-appointed machine, with untrue wheels, and expect him to turn out as good work in an hour as he does by other means after years of training, and the result, of course, will be disappointment and condemnation of the unfortunate emery wheel. This may be considered an overdrawn picture; any manufacturer or traveler will tell you it takes place every day. Again, do not commence your emery work by attempting to do something you cannot do with ordinary tools. Get accustomed to the new system, and then apply it to the different jobs.

ENGLISH SHIP RAISING APPARATUS.—Iron describes the apparatus employed in raising the paddle-steamer *Edith*, sunk in Holyhead harbor on the 8th September, 1875, and to furnish an account of the operations. Various attempts were made to raise her up to the middle of 1876, but all failed; and it was not until eighteen months after the latter time (in December, 1877) that success was achieved. The depth of the water in which the *Edith* was sunk was 36 feet at low tide, and her weight was calculated at 800 tons. The lifting apparatus consisted of four large caissons, each about 59 feet long, by 15 feet wide and 15 feet deep, each divided into four compartments, and stayed inside with timber. The caissons were constructed of 3-inch plate, riveted to angle irons. Each pair of caissons was kept rigidly apart by wrought-iron girders. The five forward girders of the how cradle were plate girders. The eleven girders of the stern cradle, and the remaining six of the bow were plate for a distance of 18 feet at either end. To the ship's side the attachments were made by means of 39 steel wire-ropes, which were securely wedged into holes, five inches in diameter, cut into the ship's sides. The pumping was effected by means of two 10-inch centrifugal pumping engines. On the morning of the 4th of December the cradles were got into position over the wreck, and sunk till they drew seven feet of water. The wire ropes, each of which had been lengthened by the addition of two steel wire strops, four feet in length, were then handed up by the divers, and the eyes passed over the screw hooks, and an equal strain on each attachment obtained. The water was then pumped out, and as the tide rose the ship floated, the cradle having about four feet freeboard.

STEAM MOTORS ON STREET CAR TRACKS.—As Philadelphia has been widely noticed as a mover toward the use of steam on street car tracks, and as the dummies have been thrown out of use, it is interesting to note the reasons for their rejection. The *North American* of that city, in its issue of the 12th inst, says: President Baugh, of the Market street railway, was called upon by a reporter of the *North American* last night to ascertain if the rumor relative to the withdrawal of the steam dummies from the road was true. “Yes,” said the President, “we shall take them off Saturday (to-morrow), in compliance with a resolution passed at the last meeting of the board. At present there are but three dummies running—one Baldwin and two Mays. The Pyatt concern has left us, having been purchased and sent South. There are four of the Troy pattern that are out of repair and used up.” In reference to the cause for the action of the board the President stated that it was not from any failure of steam as applied to street cars, for the experiment had proved greatly successful, but because the company was compelled to keep as many men to look after three dummies as could attend to twenty-five. This fact added greatly to the cost of the running expenses. The dummies had only been abandoned for the present, he added, and if there had been ten to run on the road they would have been allowed to remain. Mr. Baugh said he favored the idea of motors, as the dummies, especially in the summer, are hot and smell badly. Then it was impossible to obtain a satisfactory rate of speed by running steam between horse power, although the board is satisfied that steam can be run successfully on the road.

A WAREHOUSE BUILT OF IRON.—A novel feature in building construction, due in great measure to the present exceptionally low price of iron, has been introduced in the erection of a large warehouse in Manchester, England, and which *Iron* describes as follows: The building, when completed, will cover an area of about 600 yards, consists of three fronts six stories high, the whole of which are constructed of cast iron. The main structure consists of vertical iron standards, one foot nine inches wide and one foot nine inches deep, the corices and strings are six inches wide, and are carried on stretcher beams running between the vertical standards, whilst the floors are carried by means of cast-iron columns, between which and the vertical standards are cast-iron girders, and the whole framework of the building is thus tied firmly together. The outside decorative features are in the Italian style, and the face of ornamented cast iron, is hung on to the framework and bolted, but in such a manner that in the case of the bolts decaying, the ornamented castings will still remain in place. The advantages claimed for this system of building are, with the present price of iron, its cheapness, the great saving of wall-space, and the large amount of wall-space which is procured. This class of buildings is a new feature for Manchester, but Mr. Synde has been commissioned to carry out other important work of a similar character.

SCIENTIFIC PROGRESS.

American Archaeology.

For more than a quarter of a century, the Smithsonian Institution has been engaged in researches concerning the antiquities of America. As the result of its efforts many important memoirs have been prepared, and published in its Annual Reports and in the Contributions to Knowledge; and the National Museum, in charge of the Institution, has become the depository of the largest and most valuable collection of American aboriginal relics in the world.

In continuation of previous effort in the same direction, the Institution contemplates the publication of an exhaustive work on American archaeology, with numerous illustrations. This will be accompanied by a series of maps, exhibiting by appropriate signs and colors the localities and distinctive characteristics of ancient mounds and earthworks, shell-heaps, cave and cliff-dwellings, masonry, sculptured slabs or carved images, inscriptions and rock paintings, graves and cemeteries, aboriginal quarries and salt works, caches or deposits of objects in large quantities, workshops or places of ancient aboriginal industry, ancient roads or trails, and reservoirs and aqueducts. To this end the Institution desires to collect from every available source, whatever is now known, or can be ascertained by special investigation, of the antiquities of North America; and it invites the co-operation of all. Prof. Henry, the secretary, has issued a circular in pamphlet form, which describes the classes of facts which are desired, and all who desire to aid in this interesting work would do well to apply for this circular to Prof. Joseph Henry, Washington, D. C.

ELECTRICITY FOR STREET LIGHTING.—The New York Sun gives an account of some experiments by J. B. Fuller, who proposes to light streets and dwellings with wire. It was in operation last week. A small steam engine furnishes the motive power for the machine, which is very simple, consisting of an armature revolving between the poles of a powerful electromagnet. A strong current of electricity is thus generated. Two electric wires are attached to the machine, and they convey the electricity to the various burners. Each of these burners consists of sticks of carbon separated by a piece of glass, which are attached in an upright position to the wires. The electricity is ignited by the application of an ordinary piece of material to the burners. The light thus produced is dazzlingly brilliant and very beautiful, so far surpassing the ordinary gaslight that the latter looks yellow and dirty beside it. Any number of lights may be supplied by the same wires, and Mr. Fuller has succeeded in so subdividing the current of electricity that any one of the lights can be extinguished without affecting in the slightest degree the other lights on the same circuit. This has not been accomplished before. Mr. Fuller says he can light buildings in any part of the city by extending his wire to them through the streets. He also says he can light the streets with electricity, and to prove this he has stretched his wires to a post on the sidewalk in front of the building, where he keeps a light burning every evening. This light is far more brilliant than any calcium light, and illuminates the street for a block. One of these lights would illuminate a whole block, and far better, too, than a dozen or more of street lamps. In lighting up a house, porcelain or ground glass shades are used for softening the glare of the light. The cost of production is very slight, much less than that of the ordinary gas.

THE BED-BUGS IN SWALLOWS' NESTS.—During a late trip to the western Territories, Prof. Leidy, while watching some cliff swallows passing in and out of their mud-built nests, was told that these nests swarmed with bed-bugs, and that people would not usually allow the birds to build in such places, because they introduced bed-bugs into the houses. He collected a number of the bugs from the swallows' nests, as well as from the houses. The latter were found to be the true bed-bug; the former the *Cimex hirsutinus*. The bugs infesting the hat and pigeon have likewise been recognized as a peculiar species, with the name of *C. pipistrelli* and *C. columbarius*. The habit of *C. hirsutinus* was found to be similar to that of *C. lectularius*, the bed-bug, in the fact that the bugs during the day-time would secrete themselves in the crevices of the boards, away from the nests. After sunset he had observed the bugs leave their hiding places and make their way to the nests. From these observations it would appear as if the bugs peculiar to these animals (swallows and men) did not reciprocally infest their hosts.

APIARIAN SCIENCE.—The Paris Agricultural and Entomological Society has applied for the grant of a piece of land in Mont Souris, for the establishment of a model apiary, and for the cultivation and exhibition of all kinds of plants most suitable for purposes of bee-keeping. The Municipality of Paris, to which body the ground in question belongs, have acceded to this petition on the sole condition that the whole establishment shall be open gratuitously to the pupils of all municipal schools of the capital at certain times and under proper supervision.

CALCULATING ASSAYS.—A correspondent sends the *Jeweller* the following very convenient method of calculating assays: “The method of calculation ordinarily employed and recommended by Fresenius, for reducing to troy ounces per ton the amount of silver obtained from our test assays, is complicated and liable to lead to mistakes on account of the amount of figuring required. We employ a method in the works here very simple, requiring no figuring, and also saving much time, which may not be known to all of your readers, and hence may be interesting and useful to some. This is based on the fact that there are 29,166 + troy ounces in a ton of 2,000 pounds. Now, we take a quantity of ore or hullion that represents a ton—say 29,166 + milligrams or 29,166 + grams, and divide it into three equal parts. For this purpose we have a weight or quad which is exactly counterbalanced by 9,722 + grams. The 9,722 + grams is the most convenient-sized button to make, and besides we make three assays at the same time; however, any fraction of 29,166 + may be used. The three weighed quantities of ore or hullion are subjected to the ordinary process of assay, keeping each in a separate cupel, of course. The combined weight of silver buttons obtained in milligrams will give the number of troy ounces per ton of 2,000 pounds. It will be observed that the silver may be calculated seven different ways—combined, separately, etc. This method may be applied in any case where any fire assay is used. We have used this process of calculation in the assay office of the smelting works here for some time, and find it very accurate, besides a saving of time and figuring.”

A NEW EXPLOSIVE.—It was stated at the last meeting of the Royal Dublin Society that a new explosive agent has been discovered by Professor Emerson Reynolds in the laboratory of Trinity college, Dublin. It is a mixture of 75% of chlorate of potassium with 25% of a body called sulphurea. It is a white powder, which is very easily prepared by the mixture of the materials in the above named proportions. The new powder can be ignited at a rather lower temperature than ordinary gunpowder, while the effects it produces are even more remarkable than those caused by the usual mixture. Dr. Reynolds states that his powder leaves only 45% of solid residue, whereas common gunpowder leaves about 57%. It has been used with success in small cannon, but its discoverer considered that its chief use would be for blasting, for shells, for torpedoes, and for similar purposes. Dr. Reynolds pointed out that one of the advantages this powder possesses, is that it can be produced at a moment's notice by a comparatively rough mixture of the materials, which can be stored and carried without risk so long as they are separate. The sulphurea, the chief component of the new explosive, was discovered by Dr. Reynolds about 10 years ago, and could be easily procured in large quantities from a product of gas manufacture which is at present wasted.

SPONTANEOUS COMBUSTION.—A writer in the *Mechanics Magazine*, London, in giving an account of his experiments with spontaneous combustion, states that he took a handful of cotton waste, soaked it in the oil to be experimented upon, wrung out the excess of oil, and then put it into a box along with some dry cotton. The box with contents was then heated to 175° Fah., and in 75 minutes the cotton saturated with hoiled linseed oil was found to be on fire. Boiled linseed oil and seal oil were found to be the most combustible; next in order came lard oil, which took four hours; raw linseed oil took four to five hours; rape oil and gallipoli-olive oil took a little longer than the last. All the oils thus named are ethers of glycerine. Castor oil, which is not an ether of glycerine, took two days to ignite spontaneously; sperm oil, too, does not ignite; and the petroleum actually stop the spontaneous combustion of the oils above mentioned.

NATIONAL OBSERVATORY.—The *Independent* says the movement for a new building for the National Observatory at Washington seems to make good progress, though it is not yet safe to predict what Congress will do with the bill to provide for its erection. The location of the present building is as bad as it can be; if for no other reason, on account of the malaria which has already broken down the health and threatened the life of most of the observers. But, aside from this, the old building no longer answers or can be made to answer the needs of modern astronomy. The plans for the new building, which have been sent for examination and criticism to most of the leading astronomers in the country, seem to be admirable, providing for all present necessities and for prospective wants.

FRENCH ACADEMY.—The last meeting of the Academy of Sciences of France was rich in practical reports and promising suggestions. M. Deschamps explained the details of a system he has devised for utilizing the motive power of the tides; M. Gaston Plante presented a memoir on the rheostatic machine, and on the different nature of sparks produced by positive and by negative electricity respectively; M. Toselli intimated his readiness to produce, artificially, large hocks of ice in less than two minutes; and M. Lecoq de Boisbaudran announced that he had succeeded in obtaining the chloride, bromide, and iodide of gallium in relatively considerable quantities, and that he had determined the atomic weight of the new metal as 69.9.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

DOUBLE STANDARD.—*Chronicle*, April 27: This mine at Monitor, has started up with two of Frue's concentrators, it being the intention to concentrate their ore and ship to San Francisco for reduction. The mine is being put in good condition. The mill runs live stamps and more will be added if the concentrators do their work to satisfaction and require it.

THE ADVANCE.—The crosscut in the north drift is in 22 feet in good ore. In the raise, to connect the winze with the air shaft, good ore is being found, some assaying as high as \$700 to the ton.

AMADOR.

ITEMS.—*Ledger*, May 4: The old Hite mine near Fiddletown, is to be started up with good prospects. The ore from the Phenix appears to be getting richer every day. Kendall's one-stamp mill above Volcano, is capable of crushing three tons of hard rock per day.

FRESNO.

RICH QUARTZ.—*Republican*, May 4: The Fresno mine, on Gold gulch, is developing a wonderful body of rich ore, and other mines now being opened promise well. As for quartz mining, this region is almost wholly new, though it has furnished good placer diggings for many years. This will evidently prove a very rich mining region when developed, and will add greatly to the wealth of the whole country.

INYO.

DEFIANCE.—*Coso News*, May 4: More track has been laid in the tunnel and drifts, additional cars provided, and better facilities generally perfected for the more rapid extraction of ore. Hauling of ore to the furnaces, and supplies of wood, coal, etc., are being received so that the two furnaces will very likely be started up again about the 15th instant, and will probably make a more extended run than the last one.

NEW COSO.—This company hopes to be able to start up again soon, if the miners will work at the rates offered and they can obtain cheaper freights.

MODOC.—Starting up has been a little delayed to get the water pipes in order. Furnace No. 1, however, was started yesterday morning, and is working very satisfactorily so far, and No. 2 will probably follow in a day or two.

MINNIETTA.—A number of men have been set to work preparatory to operations on a more extensive scale soon.

MARIPOSA.

VICTOR COPPER MINE.—*Gazette*, May 4: There are three different classes of ore in this mine—yellow, gray and black oxide; the yellow assays 30% copper; the gray from 36% to 42%, and the black 70%. A tunnel has been run in three hundred feet, and a shaft seventy-five feet on the vein, which varies from two to fifteen feet in width. There are also pockets in this ledge—harren in copper—that yield free gold. At the present time Mr. Quierolo the owner, is taking out about twenty tons of ore a day. With the necessary arrangements for reducing the ore, or even with better facilities for freighting, this would undoubtedly be a valuable property.

NEVADA.

ON THE RIDGE.—*Transcript*, May 4: The Eureka Lake company are washing on several of their claims with a full head of water and with great success, having never before taken out so much gold. Several other companies are washing in the vicinity of Columbia hill, the gold taken out there aggregating some \$50,000 per month.

THE BYRNE MINN.—Concerning this property now being extensively opened, Mr. Fred. A. Sacket writes the *Transcript* as follows: I leased a portion of this mine, with which Mr. Roht. M. Fryer is now actively associated, three years ago for hydraulicing, and with the most satisfactory result to Mr. Byrne and myself. I only washed about two acres and found 11 tons of float quartz on the rim rock that milled in free gold from \$65 to \$112 per ton. I think there is a gravel channel a short distance south of my working, and that a rich lode of quartz crosses the ground. This opinion seems to prevail among miners who have seen the ground and the character of the quartz taken from the washing. Mr. Byrne's refusal to extend the lease to me for a longer time, leads me to believe that he is aware that the lode is near by.

THE IRON CLAD.—Two crushings have just been made from this mine. The first was four loads taken from the croppings, which yielded \$42 per load; the second was eight loads taken from the shaft at a depth of 50 feet, which gave \$265.50, or a fraction over \$33 per load. The gold is of excellent quality, worth \$17.50 per oz., indicating that the mine is a valuable one.

THE OLD ROCK BAR.—An incline is to be put down 120 feet, at which point a new level will be opened. The water is now all out of the mine and "tributers" are taking out fine rock from the upper workings of the mine.

PLACER.

NEW DRIFT CLAIM.—*Dutch Flat Forum*, May

2: A new mining project is on foot in the Michigan Bluff district, headed by Wm. Leet, H. L. Van Emon, A. C. Bowen, and James Gould, of quite an extensive character. These parties have secured a location about four miles north of the Bluff, which they are satisfied is extensive and rich. It is a gravel claim which will have to be worked on the drift plan, and to develop it will require a tunnel of from 1,200 to 1,500 feet. This enterprise promises to prove an important one.

SHASTA.

FURNACEVILLE.—*Reading Independent*, May 2: Mining affairs here have not changed much of late. The result of the late run at the Afterthought is very flattering; the mine is being worked day and night. Mr. Crane has reduced wages at Copper City, and board being still high, the miners, provided they put in full time, clear but little during a month's work. Mr. C. thought it might affect wages in this district, but there has been no change yet. The Company feel well satisfied with their new works and can work to a good advantage at a very light expense. The Donkey has taken out some fine rock, and all now needed is good reduction works, and the hullion obtained would return a good revenue. They have a splendid ledge about four feet wide.

At Copper City they are driving the work along and will soon have a mill on the Extra at work. The company have a large hoiler at the depot for their mill, which weighs 8,000 pounds.

In the Flat Creek mining district but little is being done, except the building of an arastra by Conway, Smith & Co., which will soon be completed and a thorough sampling of the rock of all the mines there will be had. Good reports are expected.

The mines at Buckeye are about to close the season, and we are glad to know that all of them have made good wages, while many have done still better.

SIERRA.

ABOUT FOREST CITY.—*Mountain Messenger*, May 4: Mining news is not very plenty at present, as many prospecting claims have not commenced their summer work. The Oriental Quartz M. Co. are getting along nicely, and have some rich rock already where the first owners left off. They are getting the water out of the lower levels, and will soon be ready to start up in shape. There is every indication that they will have a good paying mine. The Golden Star company is steadily developing a fine body of rich gravel, and by another water season it will be in full blast. Other claims about as usual.

PLIOCENE.—The new pumping machinery and pump for the Pliocene mine was got to the works last week, and is probably in working order before this time. The weight of the new pump and fixtures is 5,800 pounds. The shaft was pumped dry with the old pump. The snow is still about six feet deep at the mine.

TRINITY.

GOOD YIELD.—*Journal*, May 4: The Weaverville D. & H. M. company took out \$5,700 at the Ward mine this week. The yield is considered satisfactory by interested parties, as it was only a partial clean-up.

DEADWOOD.—This is a lively camp. There are four or five good claims, which the owners are working by the old arastra style, and from what little they have done their results have been highly satisfactory. They are sensible in first thoroughly testing their claims before going to the expense of erecting expensive machinery for the permanent working of their rock.

TUOLUMNE.

THE YANKEE HILL.—*Independent*, May 4: Jas. Barron, with two other men, with his Giant, worked out a piece of ground here 316 feet long, 150 feet wide and 50 feet deep, in 28 days of 11 hours per day. He will have his elevator working soon.

Nevada.

WASHOE DISTRICT.

CON. VIRGINIA.—*Gold Hill News*, May 8: The shaft was shut down on Saturday last for repairs, which will take 60 days or thereabouts to complete. During that time only the California mill will be kept running on the ore, as the facilities for hoisting through the C. & C. will not admit of attempting to run more. Double shifts of eight-hour men are employed in doing the repairing to the shaft, the men changing every hour on account of the great heat. The ore stopes in the mine show no new features or changes of interest. The face of the south drift on the 1600 level continues in low grade ore. East crosscut No. 4 on the 1700 level is steadily advancing, the face in clay and porphyry. On the 1850 level the week has been mostly spent in timbering west crosscut No. 2, so that but little prospecting has been done. The south drift on that level is being again rapidly advanced. Sinking the C. & C. shaft is progressing at the rate of two feet per day, the bottom still in hard blasting rock and the flow of water quick and strong. The sinking was delayed two days during the week by necessary repairs to the hoisting engines and other machinery. These repairs have been completed, and everything is now running as usual.

CALIFORNIA.—Work in the mine has been very much interfered with during the week by the making of some necessary repairs to the hoisting machinery and shaft. This, along with the necessity for hoisting enough ore through the C. & C. shaft to keep the Consolidated battery mill running, has caused the shutting off for the month of all the mills ex-

cept three, the Brunswick, Morgan and Bacon. This will greatly reduce the regular monthly production of the mine, but will make no difference in the payment of the regular dividend of \$2 per share, as there is an ample surplus in the treasury for the making up of any deficiency that may occur. No changes of value to report in any of the ore-producing sections of the mine, the stopes showing well in every quarter.

OPHIR.—Sinking the winze on the east ore vein below the 1900 level is making steady progress. It is now down 78 feet. The vein of ore recently struck still shows on the east side of the winze, having passed nearly out of it. It is still very rich, and is about three feet in thickness. West of this ore the material is quartz of a good character, mixed with low grade ore, for several feet, and was again showing on the west side of the winze last evening, small veins of very rich ore. Sinking the main incline shaft below the 2000 level to reach and open up the 2100 station is making good progress. A drift east has been started on the California line on the 1900 level, to reach a point at which it is the intention to sink a winze to connect with the drift on the 2,000 level when they shall reach that point.

JULIA.—Day before yesterday a strong pocket of water was struck in the south drift on the 2000 level. This water is being hoisted to the head of the incline with the small giraffe, from whence it is hoisted to the surface by the pumps. It is only a pocket and probably will not last more than a day or two more. The foundation for the incinerator pump and pumps is all ready to receive the machinery, which was received at the mine last evening, and is being placed in position for use as fast as a full force of men can accomplish it. Everything will probably be in readiness for operation in three or four days more. The south drift on the 1800 level has reached to within 30 feet of a point directly under the Ward shaft. As soon as that point is reached an upraise will be made to connect with the bottom of the Ward shaft, which, when completed, will thoroughly ventilate both mines to that depth. The water strike has prevented the starting of an east drift on the 2000 level, with which it was the intention to follow up the drill hole recently run in that direction.

SAVAGE.—The main east crosscut on the 1600 level has been retimbered during the past week, so that but slow progress has been made with the north and south lateral drifts on that level. Everything being now in good working order, better speed must be the result. The pump boi-pit at the 2000 station is being repaired and a portion of the main incline is being retimbered. The water is reduced 25 feet below the 2100 station, the lowest point ever yet reached since the mine was flooded.

YELLOW JACKET.—The north winze below the 2200 level, is now down 215 feet on the slope. The bottom shows quartz of a favorable character, giving assays of from \$8 to \$10 per ton. The ground continues hard and dry. On the 2000 level the track is completed through to the Crown Point drift, and boxes are in place for carrying the water through from the Yellow Jacket to the Crown Point and Belcher drain shaft. The requisite stone is being received for the dam on the 1700 level, by the construction of which the cost of pumping some 50,000 gallons of water daily is expected to be saved.

OVERMAN.—The station at the 1600 shaft is fast approaching completion, and the excavation for a sump will soon be finished, so that a drift to prospect the ledge will probably be started some time during the coming week. A breaking of a spur-wheel of the hoisting engine at the head of the winze on the 1400 level has interfered considerably with the sinking winze, but that is now repaired, ready to start up again. Sinking the joint Caledonia winze on the south line is making good progress.

BELCHER.—The main north incline has reached the 2360 level, at which point a station is being out in preparatory to starting a drift eastward to prospect the ledge. It will be necessary after the station is opened to sink the main shaft some 30 or 40 feet deeper for a sump in case water should be struck.

SIERRA NEVADA.—No work has been done on the 2000 level during the past week, the entire time being employed in obtaining and setting up a new air engine on the 1700 level, in place of the one disabled. This engine was started up last night, and work was resumed in good earnest again this morning.

SILVER HILL.—The new cylinder and fly-wheel are in place and work well. Sinking the main incline is going steadily ahead, the bottom in good working ground.

BALTIMORE AND AMERICAN FLAT.—The northeast drift on the 1050 level shows no change of value during the week. The upraise to connect with the 800 level is going steadily ahead.

UTAH.—The south lateral drift on the 1350 level is now in a distance of 666 feet, the face in favorable vein matter.

LADY WASHINGTON.—The east crosscut on the 1150 level is being steadily advanced, the face in a very fine character of vein matter, containing some quartz and spots of ore. The north drift on this level is being pushed forward on the west side of the ore vein, the face of the drift cutting occasional lumps of good ore.

HALE & NORCROSS.—The pumps have been kept steadily running during the week, and now that the new donkey pumps of the Savage are in place and running, the pumps of the two mines are steadily gaining on the flow of water.

GOULD & CURRY.—Work has been resumed in the west drift on the 1900 level. This drift

is being cleaned out and repaired. Cleaning out and repairing the south drift on the 1900 level is making steady though slow progress, on account of the intense heat.

CON. IMPERIAL.—It was found necessary to sink the joint Alpha winze 30 feet below the 2400 level for a sump, which has been done.

BULLION.—The east crosscut on the 1840 level is being pushed ahead, the face still in quartz and vein matter of the most favorable description.

CHOLLAR-COMBINATION SHAFT.—Sinking the Combination shaft is going steadily ahead. The flow of water is still quite strong, but is taken up with the loose rock in the skeets without the aid or expense of any pumps whatever.

SUTRO TUNNEL.—Total length of tunnel last evening, 19,582 feet. During the past week the ground in the face of the header has worked more favorably, allowing of better headway being made. The heat is very great, but water does not interfere.

JUSTICE.—Daily yield, 120 tons of ore, keeping the Pacific mill steadily running. The ore stopes yield well, and continue to open up handsomely on the 1150, 1000 and 800 levels. The drifts to the south and east on the 1150 level are opening up some very good bunches of ore.

CALEDONIA.—Sinking the joint Caledonia winze below the 1400 level is making fair progress, the water coming in being hoisted with the rock. The east drift on the 1600 level is also making fair headway, the face in soft porphyry. The face of the main north drift on the 1600 level is still in favorable vein matter.

BEST & BELCHER.—Cutting out a station on the 1900 level in the joint winze on the Consolidated line is making good progress. The entire station is in quartz mixed with porphyry and clay that affords assays of \$3 to \$5 per ton.

AMAZON & GLASGOW.—The east drift on the 500 level is being pushed ahead. Some very fine stringers of quartz have been cut by this drift during the week.

UNION CON.—The joint east crosscut on the southern boundary line on the 1600 level is steadily advancing at the rate of three feet per day, the face still in vein matter of a very favorable character.

TROJAN.—Opening up the ore stopes on the 350 and 400 levels continues without interruption, the stopes looking well and yielding good ore, which is being shipped to the Vivian mill, on the Carson river, as fast as it is extracted.

ALTA.—The pumps are all working splendidly, and the water is reduced sufficiently to admit of a resumption of work on the 1300 level.

LEVIATHAN.—The bottom of the main incline, below the 600 level, continues in hard rock, with occasional streaks of softer material.

EUREKA DISTRICT.

MINING ITEMS.—*Sentinel*, May 4: Shipments of ore to Salt Lake have been resumed, and carloads of the article go forward daily. Buyers allow \$30 per ton for the lead this ore contains. There is one million bushels of coal burned and stored in the vicinity of Alpha and Pine stations. The Pope & Hamilton mine, at Secret canyon, in opening out finely. Sinking has been recommended in the Bald Eagle claim, and the shaft will be carried down a further distance of 150 feet immediately. Encouraging reports come to hand concerning both the Phenix and the Helen Mountain mines. There is a hint of further grand developments in the Eureka Consolidated mine, at a point below the eleventh level. There is no longer any doubt but that the Hamburg company have struck a bonanza on the 250 level. Explorations prove it to be an extensive and rich deposit. From 12 to 20 carloads of crude bullion, ranging from \$15 to \$35,000 in value, continue to be shipped from Eureka daily.

OSCEOLA DISTRICT.

THE OSCEOLA PLACERS.—The pay dirt here, says the *Ward Reflector*, is good, the belt being between three and four miles long and 100 feet wide. The deposit is 50 feet to bedrock in the center, with colors all through. At the bed rock from 75 cents to \$1 a bucket is common, and for at least six feet above the bedrock it will go from five cents to a hit. When the channel reaches the foothills it takes a jump-off and the gravel is increased in depth 20 feet. The want of water is what is particularly the matter with Osceola. The cost of bringing in an amount sufficient to meet all the requirements would not fall far short of a half million dollars. This outlay many with abundant means would hesitate to make. Nothing short of 500 inches of water will do. Besides the placers there is much wealth there in quartz veins.

PARADISE DISTRICT.

LOCALITY.—*Silver State*, May 4: This district lies east of Paradise valley and north of Golconda. The principal mine here is the Credit Mohliher. It was located in 1872. The owner has expended some \$9,000 in a shaft sunk 85 feet, and a tunnel run 185 feet. It is believed to be one of the best mines in the State. The vein is about four feet wide and ten inches of the lode assays \$1,000 to the ton. The ore is black sulphurets, of 55% gold and 45% silver. The vein lies in porphyry and granite. There is a small spring of never-failing good water at the mine. Mr. Sadoris, the owner requires the aid of some capital to further open this property and put up hoisting works. Any money so expended would be a good investment.

OREANA.—The smelting furnace at this place has been sold to the Pearl Co., who have put a force of men at work sinking a shaft on

a very promising vein of ore. General L. A. Buckner is developing a fine property in the Montezuma mine.

BIG PRIZE ORE.—An assay made at Gold Hill shows that the ore contained \$282.71 in silver and \$25.01 in gold per ton. One hundred pounds of ore sent to San Francisco and reduced by mill process yielded bullion at the rate of \$201.92 per ton.

RAILROAD DISTRICT.

COPPER MAT.—Eleven ton of copper matte have been turned out here. This matte contains about 80% copper, and is shipped to Baltimore. The ore is reduced to matte at the mine, by a new process, which is said to work well.

THE SULPHUR BEDS. Both the San Francisco and Nevada California sulphur companies are running their respective mines quite lively. The latter are about to put up steam refining works, which they expect to have running as soon as the machinery, which is now on the way to this mine, can be put in place.

WHITE PINE DISTRICT.

THE TUNNEL.—*News*, May 4: The Eberhardt tunnel has passed the 3,000-foot mark, and we learn that the header is again in vein matter, which gives encouraging hopes of this near approach to something more valuable. The tunnel is now in the vicinity of ground that proved very valuable near the surface, and its course during the next 500 feet will be watched with much interest, both here and on the other side of the Atlantic. The management entertain great hopes of the next two or three months explorations. The upraise in the drift is being explored with a force of 20 miners, and a large body of quartz is being penetrated, the assays from which continue to improve. The company's mill is undergoing repairs, and will probably be ready to start up in June. Teams have commenced hauling ore to the mill, and as the roads are good the work will be vigorously prosecuted.

REVEILLE DISTRICT.

THE GILA COMING UP.—The Gila mill will commence crushing ore about May 1st. There is an unusual quantity of rich ore in sight in the mine—far more than there has been at any time since the bonanza of 1875, that first introduced this name to the favorable notice of the stock-dealing community. The ore is of the same high grade as formerly, and the present outlook warrants us in stating that this property is bound to go to the front among the "outside" mines of Nevada. Stockholders may soon expect a resumption of dividends.

MUNCEY CREEK DISTRICT.

THE MINES.—Work is being done on several claims here, and generally with good prospects. In the Clipper, a 14-foot ledge has been cut. The ore is free milling, and has assayed as high as \$400 per ton. The Pledgman mine also being worked, yields ore that goes \$50 in silver, with 50% lead. The Champion has 40 tons of ore on the dump, and the Centennial 150. Their shaft is down 80 feet. At the Golden Gate mine they have had assays of \$11,000 in gold. Read has two claims, working \$70 to the ton, and 30% lead. He has a shaft down 60 feet. Wood and water are to be had in abundance all over the country and in the immediate vicinity of the mines.

Arizona.

THE OLD AJO MINE.—*Sentinel*, May 4: Active operations have been commenced at this locality. Eight men were at work last week, and the force is being increased to 30. Several parties have located mines there, each claiming to have the original, old, simon-pure Ajo. If specimens count for anything, they have all got good property.

THE WASHINGTON.—This mine has been sold to J. B. Haggin, of the firm of Haggin & Tevis, San Francisco. It lies about 75 miles southeast of Tucson, carries an ore body 60 feet wide by 400 long, and the average assays have been \$130 per ton. Two shafts and crosscuts in the ore body fully demonstrate its value. Water, wood and grass are plenty. The new owners have plenty of money, and propose to erect a 20-stamp mill at once, with power for 40. Large results are expected.

THE HACKBERRY MINE.—Advices from the above mine, under date of April 28th, represent the new mill as having been completed and in successful operation for 10 days. The mill was running very smoothly, and is pronounced a first-class job. The furnace (a Kewell) was chloridizing up to 92 per cent. Pulp assays averaging \$182 per ton. The mine was looking very finely at all points. About 1,000 tons of ore are already on the dump, and enough ore developed to supply the mill at least 18 months. A new set of hoisting works are now being erected, and when these are completed, sinking on the main shaft will then be continued. There seems to be no mine in the Territory of more promise than the Hackberry.

Colorado.

CLEAR CREEK.—*Miner*, May 1: A lack of water in the mines of Democrat Mountain threatens to seriously impede operations there this season. The drifts on the Lucky lode show it to carry five inches of ore that yields much zinc and about 150 ounces of silver to the ton. The Emma claim carries an ore rich in both the carbonate of copper and silver, the last run of which yielded for first-class 1,010 ounces, and 499 ounces for second-class. There is but little ore in the breast of the drift, but sufficient at different points in its length to indicate its high grade. The most of the leasers here are making

fair wages, those working on hire being also mostly employed.

Dakota.

BLACK HILLS MINING ITEMS.—*Times*, April 27: Many miners are leaving the upper camps to go prospecting, some giving up regular employment for that purpose. The late stormy weather, and consequent bad roads, are retarding mining operations very much in the Hills. A great number of valuable ledges have been located and partially opened off to the south of Deadwood, in the vicinity of Rapid City, Hayward, and other localities in Custer county. Much attention is being directed towards and a good deal of capital invested in that section of the country just now, a number of Eastern parties having secured properties there, will put up mills this spring. Meantime quartz operations are being prosecuted actively and successfully about Deadwood, which still continues the great center of business and immigration. By more recent advices it appears that the Father De Smet mine has just made a clean-up of 60 stamps for 26 days' run, resulting in seven handsome bricks, the lightest weighing over \$7,000, and in the aggregate very nearly \$50,000, the best result yet made on the mine.

Idaho.

THE MINING OUTLOOK.—*Avalanche*, May 4: Our mining outlook is improving, the chances being that this will be the most prosperous year in this part of the Territory seen for some time past. San Francisco parties are here examining our mines, with which they are favorably impressed, and if liberally met they will no doubt invest largely. A little pecuniary aid at this juncture is all that is required to render our mines profitably productive. Meantime work is being prosecuted on several claims in this vicinity with excellent results. The Golden Chariot is being prospected with the diamond drill. A considerable force of men will be put to work on the Belle Peck in a few days. Rumors continue to prevail of an effort to have the Poorman and the Oro Fino started up in a few weeks. At the Black Jack work is being prosecuted with vigor. There is quite a lot of ore out awaiting shipment, which will probably be crushed at the Elmore mill. The mine continues to look well.

Montana.

MEASURER COUNTY.—*Helena Independent*, April 25: A fine body of snow has fallen on the Belt range, to the great joy of miners and farmers. The drains in Avalanche gulch—with one exception—have not resulted as well as anticipated. In Magpie, work is still progressing with results much more favorable than heretofore. White's gulch miners are at work or making preparations to begin. The prospect for a remunerative season is good. Some important changes have been made in the ditches belonging to Wright, Hartop & Co., in Cave gulch, whereby the water is running on much higher ground than ever before, which will enable them to work all their ground to advantage. At Grewell's Bar the mines are being worked with very satisfactory results. Water is running in the Trout Creek ditch, but the supply is limited.

The Alta mine is likely to prove a bonanza, as during the past week the vein has widened out to six feet in thickness of very fine silver ore, the assays showing from 80 to 170 ounces of silver per ton. Two miners in running the tunnel during the past 12 days have put 50 tons of 100-ounce ore on the dump.

New Mexico.

LAS ANIMAS.—*Grant County Herald*, April 20: There are about 200 men in camp at Hillsborough, where 15 arastras are running. Yankee's mill, in full operation, consists of a two-stamp battery, four arastras and a pan and settler. Bennett & Neff will be ready to start up about May 1st with four arastras, and Judge Shaw's mill, when ready to start, will also have four arastras. This will make a total of at least 24 arastras. There are about 200 tons of good ore on the dumps. Some ore is being found here that contains 45 per cent. copper with much gold.

GEORGETOWN.—Many locations have been made at Ruby hill, the ore there assaying well. Pay pockets are also being struck every day about Georgetown, where much work is in progress, the mines looking well and some improvement in the town going on.

COPPER.—During the past two weeks Messrs. I. N. Cohen & Co. have received 46,965 pounds of copper from Clifton, Arizona, and have shipped to the railroad, during the same time, 20,772 pounds.

Oregon.

QUICKSILVER MINE.—*Sentinel*, May 1: The Emeline quicksilver claim has been bonded to San Francisco parties with privilege of prospecting and purchasing till Nov. 1st, at \$50,000. The property is already partially developed and gives evidence of large value.

PURCHASES, DITCHES, ETC.—The Sterling company has purchased the mining property of Thos. H. Gilson for \$2,000. Work on the Middle creek mines has been suspended for the present. The company expect to run a 15-mile ditch to Cedar flat, estimated to cost \$30,000, before resuming. Chinaman Lin made a clean-up at his mines on Applegate last week after a 24 days' run, and secured 134 ounces of gold dust.

Utah.

BINGHAM DISTRICT.—Salt Lake *Tribune*, May 4: Many idle mines are being started up here. Steamboat Co. are shipping ore to mill, with enough to keep it running for a long time. The Moscow has been running all winter and taken out ore that assays well, carrying also much lead. The Saturn, too, has been steadily at work, anticipating a strike soon. The Centennial, Wild Freuchman, Mohawk and Last Chance are all at work running tunnels, drifts, shafts, etc., with cheerful prospects, some having good ore bodies already opened up.

LEACHING OPERATIONS have been much retarded in the canyon by bad weather, but as soon as practicable, considerable quantities of ore will be manipulated by that process. J. P. Eastman & McEvoy have erected a tank and commenced work. The result is satisfactory, and their operations will soon be on a larger scale.

News in Brief.

MISS JENNIE LA FORREST has opened a Chinese night school at Oregon City.

REV. T. V. ROY, the reformed Brahmin, has been found guilty of bigamy in Montreal.

EIGHT THOUSAND soldiers will leave Spain for Cuba in the autumn.

DIPHTHERIA is prevalent to an alarming extent in the southern portion of Oakland.

THE Marysville *Appeal* is again complaining that the whole city is full of tramps.

THE British frigate, the *Shah*, has been ordered back to Esquimaux, V. I.

A VEIN of coal has been discovered on the Uridias place, a short distance east of Milpitas. THERE are 13 vessels carrying coal from Seattle to San Francisco.

EIGHTY-FIVE Chinamen have been set to work on the Olympia and Tenino railroad.

GEORGE WHITEHEAD, an old resident of Michigan Bar, California, was found dead in his bed at his home last week.

THE recent frost has probably ruined all the peaches, cherries and grapes in the vicinity of the Dalles.

THE March bullion product of the Eureka Co., was \$403,500. That of the K. K. Co., \$40,000.

THE rainfall last month measured 1.06 inches, and the highest temperature was 70°, and the lowest 44°.

GRACE, the only daughter of C. W. Clark, of Visalia, was almost instantly killed by being thrown from a horse last week.

THERE is a rumor that S. J. Tilden will live in Washington next winter, and give many brilliant entertainments.

IN view of the recent disturbances in Montreal, the government has taken measures to prevent the carrying of arms.

IT is estimated that the collieries of Picton county, Nova Scotia, would produce 1,000,000 tons of coal per annum.

THE San Jose *Herald* says that not less than 10,000 orange trees have been planted in the vicinity of San Jose this spring.

THE Helena, Montana, *Herald* claims that recent experiments prove that Montana is an admirable corn-growing country.

THIRTY-FOUR convicts were discharged from San Quentin last month under the Goodwin Act. There are 1,560 still left.

IT is now estimated that there will be 250,000 head of cattle driven from Texas to Kansas this season.

FARMERS on the west side of the San Joaquin river are, in places, estimating a yield of 50 bushels of wheat per acre. The average there was not five bushels to the acre last year.

CAPT. GRAY, formerly master of the bark *Mary Belle Roberts*, has been brought back to the city in an insane condition.

JAMES MCCLATCHY, editor of the *Sacramento Bee*, has announced himself as a candidate for delegate to the Constitutional Convention from Sacramento county.

THERE are about 1,000,000 operators engaged in the iron industries of the United States. The entire value of manufactured iron for one year is \$900,000,000.

A TIGHT-ROPE performer, while walking backward over a rope at Catasaqua, Pa., missed his footing and fell 50 feet to the ground. He will die.

SEVERAL of the canneries along the Lower Columbia are in operation, but as yet the salmon are running rather sparsely.

THE rent question is one of serious discussion in New York. Landlords are expected to come down much lower than they have ever done before.

THE colored people of Augusta, Ga., are working hard to make their cotton factory project a success. But the money comes slowly as yet.

THE Cheyenne *Sun* says that the loss of cattle for the entire winter will not exceed the average for the last ten years. Five per cent. is a large estimate.

THE Canadian Siamese twins, girls, are now over two months old, and thus far in perfect health. They are united by their backs above the hips, and have but one leg each.

THE police have discovered extensive illicit match factories, carried on by the Chinese in this city. They work at night, and never use any stamps.

A FAMILY named Robbins camped at the Dalles on their way to Palouse last week, which consisted of father, mother and 19 children, the oldest 21 years old; six pair of twins.

THE President has approved the Act prohibiting the coinage of 20-cent silver pieces.

THE shipments of grain from Omaha for the past six months amounted to 2,376,345 bushels.

THIRTY church to Central park in 20 minutes was this time made by the first train over the Gilbert elevated road, in New York.

JOHN REYNOLDS' California Chemical Works on the San Bruno road, was destroyed a few days ago. Loss, \$37,242; insurance, \$12,500.

THE number of Roman Catholic missionaries and teachers among the Indian tribes in the United States is 117.

THE nomination of George L. Smith, as Collector of Customs at New Orleans, has been favorably reported to the Senate.

MISS ISABELLA MCMAHON, sister of the deceased Irish exile T. B. McManus, died in this city last week.

PARKS, on trial for stage robbery at San Andreas, Cal., was convicted on the 28th of last month and sentenced to 18 years in the State Prison.

THE Meat Shipping Association at Reno is in full blast. An addition to the dry-house has been put on; other necessary improvements are also being provided.

THERE is a rumor that the Irish Fenians will collect in great force at Buffalo, for a raid on Canada, in the event of a war between England and Russia.

THE *Reno Gazette* reports that great quantities of trout are being caught by unlawful appliances at Camp 20, and calls upon the people to turn detectives and stop the business.

GEN. STONEMAN, of Los Angeles, California, has sold his oranges for \$18 a thousand on the trees. This dispenses with all expense or trouble of picking and shipping.

SEVERAL Indiana recently passed through Chino valley, on their way from California to New Mexico. They had with them a pretty large band of horses.

THE telephone established between San Francisco and Sacramento operates quite successfully, persons speaking at one end being distinctly heard and understood at the other.

THERE is a standing reward of \$1,500 for the arrest and conviction of the incendiary who fired the Santa Rosa Wine Manufacturing Company's building, on the night of the 9th of March.

ON Salmon hay (W. T.) there lives a hermit named Frost, who subsists entirely on dried salmon and cow's milk. He has a fine tract of land, and has a monomania that somebody is trying to jump it.

THE Sacramento Savings Bank has issued notice that it will no longer receive interest paying deposits because of the accumulation of money in its vaults faster than it can be lent on first-class real estate security.

THE Prescott (Arizona) *Enterprise* says: Hundreds of Mormons are coming into northern Arizona, from Utah, and settling up the mountainous country to the north and east of Prescott, likewise the Tonto Basin.

SINCE January 28th the police have arrested 256 Chinamen for gambling, 113 for visiting houses of ill-fame, 230 for cubic-air violation, 8 for carrying concealed weapons and 16 for obstructing sidewalks. The fines imposed and collected amounted to \$8,200.

IT now appears that the death of W. E. Bidleman, who committed suicide at Virginia City not long since, was not caused by domestic troubles nor anything of the kind. He was undoubtedly insane, and left an estate valued at \$30,000, free of debt.

THE high wind prevented the great balloon going up from Woodward's Gardens, May 5th, as intended. It was filled with 25,000 feet of gas, and Prof. Martin and Mr. Dam, of the *Post*, were ready to ascend as announced, but the gale put it out of the question.

MR. BENNETT, who owns a ranch near Resting Springs, in southwestern Nevada, became involved in a quarrel with the Indians, who attacked him, and in the row that ensued he shot and killed four of them.

CUBAN refugees continue to flock back to the island. Over 100 have returned from Key West. The rumors of the surrender of Maceo are received with much gratification. An easier feeling prevails among merchants and planters over the prospects of complete pacification.

JOHN MORRISSEY, the noted pugilist and gambler, and later in life Member of Congress from New York city, State Senator, etc., died last week. It is said his ill-gotten assets will not realize over \$30,000, and that the estate will not settle up the indebtedness.

THE salaries at the county hospital are as follows: Porter, \$30 per month; waiter, \$30; gardener, \$35; dishwasher, \$30; and the waiter on the women's nurses, \$35.

COLONEL BEE has received a letter from the Dairymen's Association, in New York, in which a proposition was made for 150 Chinamen to work at making butter and cheese.

THE License Collector is about to wage war upon clairvoyants and itinerant medicine vendors, in accordance with the amended law, which requires them to pay a license of \$100 each a month.

FORTY pounds of honey and two swarms of bees were taken from the roof of St Michael's church. The cupola of the Masonic hall, in Anaheim, which has been the abiding place of bees for some years, is expected to yield an immense crop.

MARK HOPKINS, Major Snyder, Julius Wetzlar, George O. Howard, W. S. O'Brien, all California pioneers and prominent among the wealthy, business men of the State, have died within the past three weeks.

How Steel Rails are Made.

The wide use of steel rails instead of the old style iron rail makes their manufacture a subject of interest. The subject is being discussed by the foreign mechanical institutes and inquiry is aroused as to the future of the methods now in use and the possibility of improvement. The following description of their manufacture is derived from a review of the subject in *Iron*: The rail-mill plant consists of the ordinary heating furnaces, a three-high roughing train, and a two-high reversing finishing train; the centers of rolls are 24½ inches apart. The roughing train is driven by a large horizontal engine, having a pair of steam-cylinders, each 36 inches diameter and 48 inches stroke, and a fly-wheel 25 feet diameter, and weighing about 30 tons. It is connected to the pinions by means of a pair of steel couplings, or "crabs," the fast one, or the one keyed on to the shaft of the engine, being secured to the loose one, or the one that receives the spindle end, by eight two and a half inch turned bolts. The spindle and hox between engine and pinions are also of steel. The pinions are of steel, having a width of tooth of 24 inches, and a pitch of six inches. The spindles between the pinions and the rolls are of steel and the hoxes of cast iron. The middle roll made of steel always runs in the same line as center of engine shaft, and the top and bottom rolls (the former of cast iron and the latter of steel) are adjustable to it. The housings are of cast iron, but the chocks, guides, guards and cramp bars are of steel; the hoxes are deep-sided, so that side-chocks are dispensed with. The roughing rolls are seven feet long in the body, and are arranged for 10 passes in such a way that one set of rolls will suit all sections of rails; they are never changed except when they require reducing or trimming up, or in case of breakage. In front of the rolls is a revolving roller drawn by means of friction gearing, and under the control of one of the men, by which the ingots are carried into the bottom grooves. Behind the rolls is a table 24 feet long and 10 feet wide, supported at the back, on the same level as top of the middle roll, by a pair of links; a second pair of links attach the front end of the table to the housings, in such a way that the table, in lifting, is drawn forward to the rolls radially from the fixed centers of those links, and for the first three or four passes the ingot is actually thrown into the top grooves without any assistance from the workman. The lifting is effected by a 10-inch steam-cylinder bolted to the sides of one of the housings, transmitting its power to the front end of the table through levers on a rocking shaft. The finishing train placed at the end of the roughing train, at a distance of about two feet from it, is driven by a pair of Ramshot's reversing engines, and have a pair of steam-cylinders, each 36 inches diameter and 54 inches stroke; the power is transmitted from the engine shaft to the shaft which drives the rolls by steel gearing having teeth of six inches pitch and 21 inches wide; the wheels are arranged as one to two and a half. The couplings or crabs, hoxes and spindles, are exact duplicates of those used in the roughing train. The finishing rolls are four feet six inches long, and are arranged for five passes, the working position of these holes being one foot above the floor line. Loose rollers running on the mill floor are used on both sides of the train for carrying the rails backwards and forwards to it, and a series of fixed rollers placed about 10 feet apart, driven by power, carry the finished rolled rail down to the saw under the loose rollers. The hot saw, three feet six inches in diameter, making 700 revolutions per minute, is placed at a distance of 66 feet from the rolls, but as the cutting level is on the mill floor, and the rolling level a foot above this, the rolling and sawing are carried on simultaneously. There are two hot banks, one on each side of the saw, which are filled alternately; by this means the rails are well hot-straightened before they are taken to the machines.

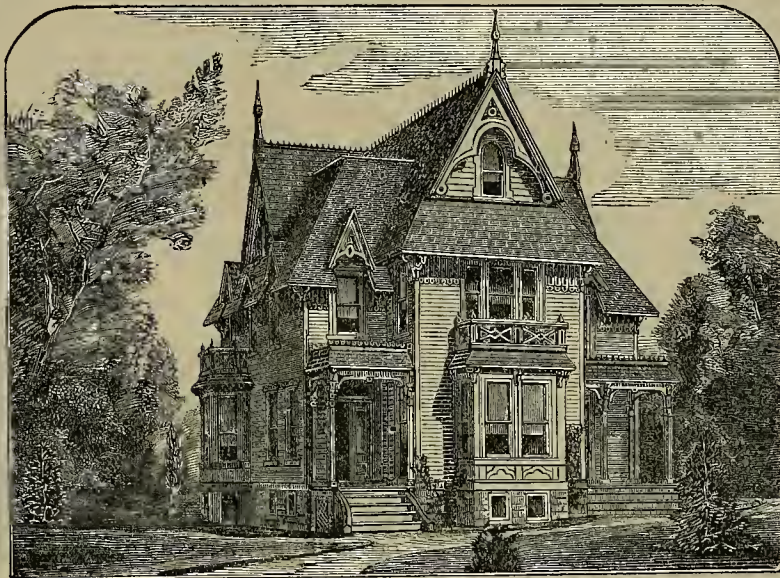
The mode of working is as follows: The ingots loaded on the mill hoxies in the Bessemer shops, red hot, are transferred as quickly as possible to the rail-mill furnaces, and after being heated are rolled off direct into rails, the number of lengths varying according to the length of rail required. Our usual practice is, three lengths for 20-foot rails and under, and two lengths for all above, up to 30 feet. The furnaces will take seven ingots in a charge, and turn out five charges per turn. The rails, after being rolled, are carried down from the rollers on the rollers described, straightened as far as possible on the hot bank, and afterwards finished in the usual manner.

THE TOWN OF WARD.—Concerning this mining camp, situated in eastern Nevada near the Utah line, the *Reflex* has this to say: Ward is at present very dull, but there is reason to believe that this will not continue. The future is now more hopeful than for many months. The first move looking to an improved condition of affairs will be the starting of the furnaces within a week, and the next, overhauling the old leaching mill, and converting it into a pau mill of the old tried and true pattern. When once both mill and furnaces are in operation, Ward will begin to look up again.

AS GOOD AS GOLD.—Currency is quite scarce, and brokers refuse to let it go under par in gold. Applications have been made for currency at the Sub-Treasury in exchange for gold coin at par, but there is no authority for the transaction of that kind of business, and of course the applicants are refused.

Rural or Suburban Dwelling.

The picturesque Gothic villa, shown in our engraving on this page, is a style which is fast becoming prevalent. It is designed by Isaac Hohbs & Son, of Philadelphia, and is something like numbers of handsome dwellings lately erected around the bay of San Francisco, and in other parts of the State. It is a graceful design, and the buildings which we have seen in the same style are fully as handsome as the picture. The shape and ornamentation of the building comport well with rural or suburban surroundings, and no one would think of building such a house unless he could give it handsome trees and tasteful grounds for its environment. This house may be placed on a foundation of rubble stone well pointed, or upon concrete, or upon the wooden base which is more common in this State. The superstructure is of frame, and the roof may be of slate or shingles. The principal rooms and hall of the first floor may be finished with black walnut, or with some of our handsome native woods. There are new and tasty designs for finishing with the natural wood, which are exceedingly neat in ap-



DESIGN FOR A PICTURESQUE GOTHIC VILLA.

pearance and inexpensive. It is estimated that a villa like the engraving can be well completed with modern appliances for about \$4,000.

The following will interpret the lettering upon the ground plan, and give the size of the rooms. First Story.—P, parlor, 14 by 16 feet, with bay window; D R, dining room, 12 by 20 feet; S R, sitting room, 14 by 15 feet; K, kitchen, 14 by 14 feet; H, hall, 6 feet wide; V, vestibule.

Second Story.—P C, principal chamber, 14 by 16 feet; C C (on the right), chambers, 10 by

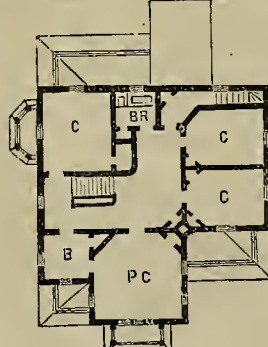
12 feet each; U (on the left), chamber, 12 by 14 feet; B R, bath room; B, boudoir.

The floor above may be finished for a commodious attic, or made into two or three pretty sleeping rooms. Any one desiring more explicit information concerning the design which we present herewith, or other points on building, will be interested in the business announcement of the architects which appears in our advertising columns.

The enormous and unprecedented thickness of some of these coal veins, and the ease with which they can be worked, is astonishing.



First Story.



Second Story.

FLOOR PLANS OF GOTHIC VILLA.

12 feet each; U (on the left), chamber, 12 by 14 feet; B R, bath room; B, boudoir.

The floor above may be finished for a commodious attic, or made into two or three pretty sleeping rooms. Any one desiring more explicit information concerning the design which we present herewith, or other points on building, will be interested in the business announcement of the architects which appears in our advertising columns.

THE GREAT GERMAN IRON WORKS.—Krupp's foundry at Essen turns out in every 24 hours about 12 miles of rails, with tires, wheels, axles and springs in proportion, as well as 1,500 shells of various sizes and constructions. In one month 300 cannons are produced, and since 1874 15,000 have been made. The establishment daily consumes 1,800 tons of coke and coal, has 77 steam hammers, 8,500 workmen in the cast-steel department, and altogether 16,200 toiling men, women and children.

STANDS WELL.—One of the smelting furnaces at the Eureka Consolidated has run uninterruptedly for the past seven months, the longest period that any furnace has lasted since the building of the work.

Colorado Coal Fields.

Prof. Hayden, in his reports of surveys made in Colorado, testifies to the vastness of the coal resources of the San Juan region in Gunnison, Onray and La Plata counties, in close proximity to rich veins of the precious metals and the line of railroads yet to be built.

From an article in the *Ouray Times*, devoted to a consideration of the mineral resources of this section of that State, we compile the following facts: The coal measures show themselves wherever cut by deep canyons and at such points as the mountains break off from the vicinity of Mount Lincoln on the north all the way to the hank of the Rio San Juan South.

This as a general thing is an excellent bituminous coal as clean as anthracite; it leaves no stain on the fingers; produces no offensive gas or odor; leaves but little ash, no clinkers and produces no more erosive effect on stoves, grates or steam boilers than dry wood. This description will apply very nearly to all the specimens taken so far from various places in this great basin. A few miles south of Animas City, in La Plata county, are veins 22 feet thick and coal from these mines has been successfully

Open Market for Farm Produce in Oakland.

There is a good prospect that the enterprise for open and free marketing of produce, by producers, will be successfully begun in Oakland on Saturday May 25th. We are glad of it, because it promises well both for producers and consumers. We have often pointed out the culpable waste of time and money which is occasioned by carrying fruit and vegetables grown in Alameda county, across the ferry to this city, causing them to run the gauntlet of draymen, and commission merchants, and then packing them back for sale in Oakland, after their freshness is all gone, and the profits on their production have been well nigh wasted in transportation and commissions. We have often thought that many Oakland people must get a poor idea of the vegetable kingdom from the stale stuff which is dealt out to them by the large squad of Chinamen who furnish them with food which has lain from one to three nights in the city. This system should all be swept away. The Oakland people should have their food fresh from the gardens and orchards, and they should have much wider variety to select from than the basket of the Chinaman, or the counters of the corner store. Fruit and vegetables can be gathered after sundown, and be brought into Oakland in the early morning, even from the lower part of the county, and it would seem probable that the price which could be gained, and the saving of freights and commissions, would make the effort profitable to the producer.

The idea is gaining approval among the producers of the county. At the last meeting of the Executive committee in Oakland, Mr. A. D. Pryal, the traveling member, was present, and made an informal report. He has been over a portion of Alameda county only, and was on the point of starting for Contra Costa county. He displayed as the result of his work so far a list of over 100 farmers who had signified their intention to be present at the opening day of the market, May 25th, with their wagons laden with the various products of their farms, orchards and vineyards. Each signer set opposite his name a list of the articles he proposed to bring in. In these lists are fruits and vegetables of all kinds. Butter, eggs, cheese, milk, cream, buttermilk, poultry, pigs, lambs and calves; honey, domestic wines, hay, grain and straw, flowering plants, rustic baskets, chairs and tables, etc. Mr. Pryal says that the list at present represents from ten to fifteen million dollars in property, the signers being the most substantial farmers of the county.

The success of the market promises to be far beyond what the most sanguine of its projectors anticipated. It will not take many market days to convince the Oakland people the advantage of buying fresh produce direct from the producer's wagon. We shall doubtless soon see in Oakland, as we have often seen in the open markets at the East, a throng of frugal housewives in neat morning dresses, selecting their dinners from crisp, dew-laden vegetables, the sweet, new butter, eggs but a day's journey from the unknown, and live stock and poultry unstained by travel.

The plan to be pursued is quite generally known throughout the interested counties by the wide distribution of handbills, but it is so applicable to a score of our other large towns and cities that we give a brief description of it. The market is to be located on the east side of Broadway, south of Seventh street, and he held on Wednesday and Saturday of each week, and not continued longer than 2 o'clock P. M. Each vehicle occupying a stand in the market must be backed to or near the curb, and placed as near as may be at right angles with the line of the street, and a space of not less than two feet must remain unobstructed between each stand. A space of 6x20 feet must be allotted for each stand during market hours, the short measurement to be parallel with the line of the street, and the stand to include three feet of the width of the sidewalk next to and including the curb. The allotment of a stand in the market will entitle the recipient to a priority of right thereto; but such right will be forfeited by his failure to occupy the stand with marketable products for three successive market days, or by a violation of the provisions of this ordinance, or the rules for the government of the market; or forfeited for the day of the market by his failure to occupy the stand prior to the hour of 10 o'clock A. M. The name of the occupant of each stand must be exhibited in conspicuous letters, and fronting the sidewalk, during the time of such occupancy, and no longer.—*Pacific Rural Press*.

TYBO MINES.—Concerning this camp, situated in Nye county, central Nevada, the *Eureka Sentinel* of late date remarks as follows: This town is prospering and the mines in the vicinity are yielding largely, and looking better than at any time since their discovery. The furnaces were to have been shut down to-day for repairs, which operation will take from ten days to two weeks. There is a scarcity of coal at the camp, and the roads are in such condition as to prevent hauling. As there are over 150,000 bushels burned and ready for shipment stacked up in the neighboring mountains, as soon as the roads dry out, there will be a plentiful supply. After the 1st prox. the refinery will make fifteen regular shipments of refined hullion per month. The crude article is accumulating at the works, there being over \$150,000 worth on hand at the present time. There are but few idle men in the town and the outlook for the coming season is very bright.

A SULPHUR MINE IN IDAHO.—This property, which is situated about five miles from the soda springs, has been purchased by Mr. Pinedo, who has had it surveyed for the purpose of obtaining a government patent. The owner will erect refining works in the district as soon as the weather becomes settled, and will proceed to convert the sulphur into a marketable article. It is used largely in the new leaching process, and can be furnished here at half the cost of the imported article. The sulphur consumed in this country is brought from Sicily, and usually costs, laid down in Utah, about \$150 per ton, but this is a superior article, and will undoubtedly soon supplant the Sicily product. Several tons have been shipped from the mines to Salt Lake, and will be thoroughly tested for leaching.—*Salt Lake Tribune*

Salt in Nevada.

Notwithstanding the vast saline deposits found in many parts of Nevada, it appears that considerable quantities of salt are imported into that State. Some of these deposits consist of extensive beds of almost chemically pure muriate of soda. Sometimes this substance occurs in thin layers on the surface of the ground, and becoming quite dry in the summer, can be readily scraped into heaps, preparatory to being carted away. When found in this shape it is mixed more or less with dust and other impurities, so that it has to be dissolved and re-crystallized, which is done by first leaching it, and then flowing the brine into shallow vats, where the salt reforms under solar evaporation. For any ordinary metallurgical purposes these thin surface incrustations are often used as scraped up on the marsh. In all of the more extensive Nevada beds the salt over a large area occurs in a very damp condition, sometimes partially or wholly covered with water. In these localities the salt is taken up with long shovels, and thrown into wheelbarrows and thrown in heaps on a wooden platform, to drain off and dry, after which it is sacked up and hauled away, being sufficiently clean and pure for every purpose, even for dairy or table use.

In the early history of Washoe, prior to the construction of wagon roads over the deserts and mountains, and while freights were yet too high to admit of salt being transported from California, this article was packed from Teal's marsh, near Columbia, into Virginia on the backs of camels, a herd of these animals having been imported from abroad for that purpose. These marshes lie, for the most part, a long way from the principal mines and large centers of population, with sandy plains and mountain ranges intervening, in consequence of which the cost of getting this salt to points of consumption has proved so great that with railroad transportation it has often been found cheaper to import this commodity for the use of western Nevada than to obtain it from home sources of supply.

The various towns and mining camps in the central and other parts of the State have always procured their salt from the native deposits nearest their respective localities, and from a letter recently written by a party engaged in the manufacture of salt in Humboldt county, near the line of the Central Pacific railroad, and published in the *Silver State*, we infer that western Nevada will also get this article from domestic sources. Speaking of the facilities at command there for salt making, the writer remarks: We built some pretty extensive works last year, and now those have been enlarged. We have at the old works vats aggregating 4,200 in length and 58 feet in width. Besides these we have finished completely new works, one and a half miles from White Plains, on the railroad, containing 4,300 feet of vats, 53 feet wide. There is abundance of brine at both works for all purposes. A steam pump is partly used at the old works, while at the new works natural springs furnish the brine, which can be run all over the vats without elevation by pumps; so in all we have 8,500 feet of vats, of an average width of 55 feet, erected at a cost of nearly \$2,000. The new works, in system as well as construction, are the best on the coast, excepting none whatever. We made lots of salt last year, but as it was all engaged, we said nothing about it, not caring to get orders which we could not fill. Our salt for purity and cleanliness is unexcelled; in fact every buyer was surprised to see such an article. From the time of gathering the first crop, say the latter part of May, or perhaps a little earlier, we anticipate no trouble in filling all orders for milling salt, and we shall do all in our power to secure the northern trade. Works for grinding table and dairy salt will be built during the summer. Our salt has been tried in curing meats, and has been found equal to the best imported article. We will call on the merchants of Humboldt some of these days with samples, and hope to satisfy them in quality, quantity and price. By close study and perseverance we have overcome all obstacles, and by increasing the capacity of the works yearly will be able to supply the State with pure salt hereafter.

"THE POOR MAN'S MILL."—The phrase "poor man's mines" is one that has been much in use on this coast, being applied to that class of mines or diggings in which ordinary wages could readily be made, or which could be opened and worked without the aid of much capital. It was a happy phrase, and to the laboring man of small means one of pleasant significance. And now we are to have what has been aptly termed "The Poor Man's Mill," the device of Almarin B. Paul, of this city, the inventor of Paul's dry crusher and amalgamator. This machine consists of a sort of arastra furnished with shoes and dies. Concerning this invention the *Arizona Miner* speaks in a very appreciative manner, declaring that it will be of incalculable advantage to the poorer class of claim owners in that Territory, inasmuch as the cost of it, only \$1,000, will enable every one of them to procure a mill of their own. To accomplish this they will only have to get out and ship to Mr. Paul two or three tons of their rich ores, which will net enough to buy one of these mills, and, if the ores be extra good, also defray cost of its transportation.

USEFUL INFORMATION.

An Expert on Mad Dogs.

We have had abundant testimony concerning the nature and remedies for hydrophobia from scientific men. It is interesting, if nothing more, to read what a practical "dog catcher" thinks on the subject: "I do not believe in hydrophobia," said Special Detective Downs, of the Philadelphia police, who has charge of the dog-catchers' squad. "In half the cases reported as mad dogs the animals are not mad. Because a dog froths at the mouth it is not a sign that he has the rabies, and I do not believe that the cases reported in Port Richmond and down town within the last week, where so many persons were bitten, were mad dogs. The people who are bitten frighten themselves into the hydrophobia. If a man's system is in good order, he will not feel the bite so much as one whose system is disordered. I'd sooner be bitten by a dog than I would by a man. It is my opinion that there is more danger in the latter than the former. I've been bitten two or three times and have not gone mad yet. After the bites, when the blood would come, people who were standing around the wagon would say: 'Why don't you kill that dog?' Well now that would be foolish, to kill the dog after I've been bitten. The harm is done and nothing could prevent it then. I always make a poultice of salt and onion to draw the poison out of the wounds, and in a short time it is all right."

"About two years ago, when I first went out with the wagon, we caught a little sky poodle and placed him in the box. He bit every dog and frothed at the mouth, and we thought for certain that he was mad. One of the darkeys went into the wagon and tied him up. When he was let loose in the yard at the pound he bit all the dogs there. So Mr. Merritt, who had charge of the place, killed him and had him dissected. He found that the animal had a large gum-boil and a decayed tooth, which accounted for his strange actions. When dogs are cutting their teeth they become thin, refuse to eat, shun water, have convulsions, froth, and persons who do not know what ails them, believe they are mad. The trouble is people do not know how to manage dogs. A scare is raised about hydrophobia, the animals are put out of the way, and they gloat over the satisfaction of killing another mad dog."

Black Flux.

Edward Kirk, in his writings on the founding of alloys, in the *Iron Age*, gives the following paragraph: Black flux, as it is commonly called, is composed of 7 parts of crude tartar, 6 parts of saltpeter, 2 parts of common bottle glass, and by some a small amount of calcined borax is added. These ingredients are first finely pounded and mixed together, and then gradually heated in an iron pot or ladle so as to burn them together. Care should be taken to not overheat the mixture, and as soon as it is thoroughly melted and mixed together it should be removed from the fire and allowed to cool. After it has cooled it is finely pulverized and sifted, and is then ready for use. It has a great affinity for moisture, and should be protected against it by being placed in glass bottles and the bottles corked up until wanted for use. This is the most powerful flux that can be made. It is but little used in forming or fluxing alloys, but it is principally used by assayers in assaying of different kinds of metallic ores. In these assays the quantity of black flux used varies according to the quality of the ores, but the amount generally used is about an equal amount of ore and flux. The ore is first roasted and then finely broken up and mixed with the flux, and the whole is then rapidly heated in a crucible. If the flux does not make the slag sufficiently fluid to allow the metal to settle, a small amount of calcined borax is added, which makes the slag more liquid, and permits the metal to pass to the bottom of the crucible. The crucible is then removed from the fire and the mixture either poured from it or allowed to cool in it. After it has cooled the slag is knocked off with a hammer and a button of metal obtained. When using this flux the clay crucible, without either coal or plumbago, is preferred, for the flux is very hard on a crucible that contains either of these substances. Black flux is used by some foundrymen in melting the fine scrap sweepings from the floor, and dross and refuse from the crucibles, by melting these in a crucible with black flux. They obtain considerable amounts of metal from them that would otherwise be lost. In melting this refuse with black flux the common clay crucible should always be used.

PREPARED GYPSUM FOR BREWING.—It is, we believe, a well-known fact that by brewing with water containing gypsum a greater extract is obtained than by using ordinary water, as the gypsum facilitates the solution of the saccharine principles of malt, whilst at the same time it prevents the solution of albuminous matter, an excess of which is so detrimental to the keeping quality of beer. Beers brewed with water containing gypsum are also paler than those brewed with common water, and become bright without the use of finings. Gypsum is also largely used in the manufacture of sherry wines. The etone itself, however, is so hard that when used in its natural state in wells, it

takes some time to dissolve. We read in the *Trade Journal* that an English firm are manufacturing a gypsum preparation composed entirely of the purest sulphate of lime, and which is not objected to by the Excise. One pound of it is advertised as sufficient for 60 gallons of water, and the firm claim that it renders the latter equal in hardness to the best brewing waters at Burton-on-Trent.

FIBER FROM HOP PLANTS.—Proposals have frequently been made, says the *London Farmer*, to utilize the stems and other parts of hop plants for the manufacture of paper and various textile fabrics, but hitherto they appear to have been turned to little practical account. It is true the stems have often been employed on a small scale in making ropes and similar rough articles, and even carpets have been produced from the bleached fibre, but anything like a general utilization of the raw material has not, as yet, been attained. We learn from a *Wurtemberg agricultural journal* that a process has now been patented by M. Nordlinger, of Stuttgart, by which the fiber can be rendered sufficiently tractable to enable it to compete with flax on almost equal terms. The stems, etc., are boiled in water, to which soap or soda has been added, for three-quarters of an hour, thoroughly washed, and then again boiled in very dilute acetic acid. The fibers are now washed free, and dried, and when properly combed can be worked like other textile materials. They are said to resemble flax fibers very closely, and to be superior to all others in elasticity, softness and durability. It is much to be hoped that this process of employing the stems may prove a practical success, for at present, if the hop itself fail, the crop so tenderly nurtured is little less than a dead loss to the unfortunate grower.

THE DESTRUCTION OF MICE.—The Prague authorities invite earnest attention to the very serious proportions the plague of mice throughout Bohemia has assumed, and recommend the adoption of a number of measures whereby they hope to stay its progress. Among these are the protection of animals destructive to mice, such as fitchets, owls, hawks, jackdaws, and crows; suffocation by the introduction of smoke, or sulphur fumes, or water in the holes; deep plowing in autumn; the distribution of pills of iron filings and yeast made up with fat, or of wheat, barley, or other grain that has been soaked for 24 hours in a solution of oak ashes, or of little balls of meal and powdered glass, or, lastly, of small bits of sponge broiled in bacon-fat. They further gave warning that all this formidable arsenal will be of little service unless it be brought to bear before the mice have gained any considerable ascendancy, for their natural fecundity is so uncomfortably great that under favorable circumstances, a single pair may reckon on some 25,000 direct lineal descendants the course of a twelve month.

GOOD HEALTH.

The Effect of Carbonic Acid Gas in the Air.

The following extract from Mr. Briggs' article on "Moisture in the Air," in the *London Quarterly Journal of Science*, will be read with interest, as presenting a somewhat new view of the deleterious character of carbonic acid gas:

An adult in still life inhales each minute about 480 cubic inches of fresh air, and exhales 488 cubic inches of vitiated air, of which vitiated air about 4% is carbonic acid, and from which about 19% of the oxygen originally supplied by the fresh air has been abstracted; the original quantity of vapor in the fresh air at mean temperature and hygrometric condition (62° and 65%) will have been increased from 1.1 to 3.08 grains. Carbonic acid gas was made the scapegoat. It killed dogs at the Grotto del Cane, as was babbly exhibited to numerous travelers in Italy at that time—and both before and since, the same unfortunate dog serving to be killed to the satisfaction of admirers, that had been resuscitated the day before, after the visitors' backs were turned. It was heavier than air, and in some conditions of temperature would not so readily diffuse, but form a layer of distinct gas, like water beneath oil. Altogether it answered the conditions of hypobaseness, and it was decided to be vile, deleterious, poisonous. To be sure we devoured it in bread, and drank it in beer or aerated waters, but then the poison was to the lungs, not to the stomach! This theory found promulgators in the lecture rooms and advocates in the household 30 years ago, and has become to-day the traditional belief of the middle aged and elderly. If a room is hot and close from excess of temperature, or from a crowd of occupants, carbonic acid gas is the difficulty; if malaria is developed in a jail or hospital, or typhus or scarlet fever exist in the dwelling, carbonic acid gas in excess is the poison. "The gas is heavier than the air, and must necessarily sink to the floor, where all the air of vitiation will be found." These notions continue to have advocates and supporters to the present time, and the popular lecturer or writer gives a half assent to them to secure the favorable opinion of audiences or readers. But step by step, during the past 30 years, it has come to be perceived that the causes of disease are not to be found with organic matter, and carbonic acid has been re-

moved from its elevated place in ventilation, with the fullest admissions that in the quantities ever present in the living rooms, except by accident, it is quite harmless; and finally, its presence has been accepted as merely a measure of other more dangerous vitiations, in that, as it is a definite product of respiration, and as the proportion present in any room at a given moment can be ascertained with tolerable exactness, an indication can be derived thereby of the extent of organic vitiation with some degree of certainty.

Lecture on Corns.

In a lecture at the St. Louis Hospital, Paris, on hypertrophy of the epidermis, M. Guibout observed that, while in callosities the hypertrophy takes place at the surface, in corns the hypertrophied part becomes pyramidal, and takes the form of a nail, with its point directed toward the deeper seated parts. This sharp point, lodged in a kind of cupola, which exactly hoxes it in, has a tendency to penetrate into the substance of the dermis whenever the base of the corn is compressed. The portion of the dermis which is in permanent contact with the epidermic induration becomes inflamed and altered in character, its papilla disappearing, so that at last it becomes a true matrix, destined to form deep, new, horny epidermic layers, in proportion as the more superficial layers are eliminated.

Changes of the weather often give rise to great pain in corns, which has been supposed to be due to their hygrometric nature, which, by causing their enlargement, adds to the suffering. But, in fact, the exacerbations are less severe during the time that it rains than they are for some days preceding; and they are also met with when the weather is about to change from wet to dry. These painful exacerbations of the pain of corns are quite as remarkable and as inexplicable as are those of rheumatic pains. The sole efficacious treatment is excision, but care must be taken that this is complete. The summit of the cone must be cut down to, so as to entirely empty the dermic cupola. And then it is quite necessary to destroy, by cauterization, the inner surface of this cupola, namely the matrix of the corn, which will otherwise be reproduced.

The best caustic is sulphuric acid, of which we may deposit a drop, by a match or glass rod, on the excised part. If the corn recurs, the same processes of excision and cauterization must again be resorted to.

INFLUENCE OF EXERCISE ON THE LUNGS.—One of the conditions of perfect health is physical exercise. In its absence the whole system suffers deterioration and falls short of that development which is necessary to the vigorous action of the different organs. More than any organ, however, do the lungs suffer; and it is not difficult to explain why. In order that an organ should be well nourished, it is necessary that it should be abundantly supplied with blood, and one of the agencies which plays an important part in propelling the blood through arteries and veins is muscular contraction. The alternate contraction and dilation of the muscles forces the blood along the vessels. When a person is exercising vigorously, the respiratory movements become greatly increased, the air vesicles become dilated, the blood is propelled through the minute capillaries which constitute a large portion of their structure, and the lung tissue receives the nourishment which it requires, and which is necessary to its integrity and efficient action. From insufficient bodily exercise, then, the lungs suffer in two ways—viz., for want of sufficient blood to nourish them and for want of necessary expansion. The result is that the lungs, more frequently than any other organ, become affected in those who lead inactive lives. This fact makes it incumbent on all, and especially on those who have weak lungs, to spend a portion of each day in vigorous physical exercise. We mean by this exercise which calls into vigorous action all the muscles of the body; exercise which causes the skin to glow, the perspiration to start. Two hours of this kind of exercise each day is not too much; and it should be performed, when possible, in the open air. A celebrated French physician says that a person, to be healthy and strong, should exercise to the point of perspiring every day.

FOR SEVERE BURNS.—If you cannot obtain lime water ready made, take unslacked lime and pour water on it. When the water is drawn off clear, mix flax-seed oil with it until it becomes yellow and thick like syrup. Apply to burns at any stage, the earlier, however, the better. We publish this because we are confident it is the best application for severe cases, as well as slight burns. It should be kept on hand always.

FOR SMOOTH HANDS.—After washing and drying the hands, pour into one hand a few drops of good cider vinegar; rub the hands together, wetting the whole surface, both sides, and dry it. Practice this and your hands will feel smooth.

TO CURE HOARSENESS.—Heat well the whites of two eggs and two teaspoonfuls white sugar; grate in half a nutmeg, add a pint of luke-warm water, stir well and drink often. Repeat the preparation if necessary.

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The Week.

Not for a year or more have we been able to announce so many indications pointing to an early improvement in our industrial and business interest, as seem to have presented themselves during the past week. Not that our material affairs have yet been restored to anything like a normal condition, this amendment being something that may reasonably be hoped for in the early future rather than a fact already accomplished. Our foundries are doing a little more work than during the winter, and it is expected that orders for mining machinery will come in more freely as the season advances. Other of our manufacturing industries are also fairly prosperous with improved prospects ahead. A slight increase in the amount of building going on keeps the saw-mills in the great lumber regions of the coast running at about their usual rate, the demand for lumber abroad not having been sensibly diminished. The mining interests of the coast are looking in a hopeful condition, even though the stock market continues depressed, and we are in hopes that the year 1878 will show even a larger bullion production than 1877, and we hope also that this bullion will come from many mines and go into many hands, instead of from few mines into few hands.

Drift Mining in Placer County.

Since speaking last week of the Pliocene channels that traverse so large a portion of the mining districts of California, and which are now being opened up at many points, we have obtained the following more full particulars of the claim belonging to the Blue Gravel Range company in Placer county, this being one of the most promising and accessible localities of the kind yet fixed upon for exploitation, and a description of which will convey a tolerably good idea of all the others.

The property of this company, which embraces an area of nearly 1,000 acres, is situated on the Forrest Hill Divide in the neighborhood of Todd's valley, being about 18 miles from Auburn station, on the Central Pacific railroad. It lies on the southerly slope of the ridge overlooking the South Fork of the American river, which runs in a narrow gorge more than a thousand feet below. Centrally through this tract passes one of the ancient gold-bearing channels, buried here to a depth of about 130 feet. Portions of the ground in this vicinity were formerly covered with rich surface placers, fragments of which still remain. There are also within the boundaries of the company's tract extensive banks of auriferous gravel, some of which might be washed to advantage by the hydraulic method and will most likely some day be so handled. The deposits resting in the beds of the buried river constitute here, however, the feature of peculiar interest and greatest value, these being also the most easily available for productive operations. As the section of the old channel owned by the company covers a linear extent of nearly 10,000 feet, having an average width of about 1,600 feet on the surface, they are supposed to have something like five or six million cubic yards of rich bottom gravel, which, according to all precedent, will yield at least \$1 per yard, the average elsewhere having been much higher.

As will be seen by an inspection of Doolittle's map of Central California, there are two main channels bearing southwest across the country here, the one coming in by Forrest hill and Todd's valley, and the other from Yankee Jim's, both distinguished for the large quantities of gold that have been extracted from them; first by drifting and afterwards by the hydraulic process. The group of claims worked along the Forrest hill branch have yielded as much gold, for the area of ground worked, as any other in California, the following being the product of some of the more noted of their number: The Independence, \$450,000; New Jersey, \$350,000; Deidesheimer, \$650,000; the Jenny Lind, \$1,100,000; mostly from the upper and poorer red gravel, and the Dardanelles, \$2,000,000 taken out of the lower stratum of rich blue gravel, the area of ground worked over in these several claims not having exceeded four or five ac. ea.

A short distance above the claim of the company we are speaking of, these two channels come together, the united channel thence pursuing its course through their ground to its lower end, where the old river bed finally disappears, having been eroded and swept away by the North Fork of the American. That this section of the channel, so deepened and augmented, is well stocked with gold, would be fairly deducible from its ascertained character above, had this fact not been established by actual workings and experimental tests. The Spring Garden claim adjoining this, on the north, has been opened and shown itself prolific in gold. The shaft put down by this company at a central point on their own ground, had also reached good gravel at the time the water broke in upon them, stopping further operations. The fertility of the channel here has, in fact, never been with the owners, mostly poor men, a question of such serious import as that of commanding the means for properly opening it. They know, as a matter of fact, that they have a section of the old Pliocene river here, and they know inferentially that it is rich in gold, but they have never been able to get it so thoroughly opened that they could reach and remove its contents.

Even in the flush times this was looked upon as a favorable site for a prospecting operation. As early as 1857 a company of miners started a tunnel from the bank of the North Fork with a view to developing the lower end of this channel. Having been disrupted by the Frazier River excitement, this company scattered the next year and never re-assembled, nor, so far as known, has any of them ever come back to prosecute the work or assert any claim to the ground, which has now for a period of nearly 20 years been in the peaceful possession of the present company or their predecessors.

After sinking a shaft to the depth of nearly 100 feet at the point mentioned, and being there prevented from going on by an influx of water too great for them to handle with their inadequate pumping apparatus, this company drove a tunnel from the lower end of their claim. After getting in several hundred feet they found the bedrock, pitching before them, showing that they were too high to bottom the channel. The tunnel was then carried down with the incline of the bedrock and a steam pump rigged for hoisting the water. But the machinery here again proved insufficient, forcing the company to once more suspend operations. This occurred several years ago, and, as the limited means of the company were by

these efforts exhausted, nothing further has since been done towards the development of this property.

Encouraged by the large returns these drift diggings are yielding wherever they have been effectually opened, the owners have concluded to make another attempt at getting their ground in proper shape for working. All that is now required to secure that end is the sinking of the present vertical shaft some 20 or 30 feet farther, and the transferring of the engine and pumps from the incline to the old shaft, there to be used for hoisting and pumping purposes, all of which can be accomplished with an amount of money so small that they ought to have no trouble in getting it.

In putting down this shaft the following material was penetrated: first, a body of cement 40 feet thick; then, a three-foot stratum of gravel; next, another mass of cement 45 feet in thickness; followed by six feet more of gravel; and finally a sedimentary deposit nine feet thick, underlain by a bed of large boulders and washed gravel, indicating close proximity to the rich stratum of blue gravel always found next the bedrock. All the gravel here intersected showed well in coarse gold, the best prospects being obtained from that nearest the bottom. With their claim in good working shape, the owners are confident that it would be netting handsome profits within 30 days after starting up.

The Relation of Science to Industry.

There has been a great deal written upon this subject; a great deal too much perhaps. There is always a certain amount of cant afloat among the people. Dean Swift used to wage bitter warfare against it. In those days it used to dress in priestly garments and assume a saintly air, now it goes about with a learned look and prates of this and that, as if it carried the cosmos under its hat and was not made of dust and ashes. But it is the same hollow pretender today that it was then. It is the same false prophet whether it stand behind the pulpit or reads a sounding paper before some learned society.

In these times we all know how common this scientific cant is, and we all know how to tell it. True science is a worker. True science thinks rather than talks. In most places there is more talking than thinking; there is more humbom than science. Again, true science is modest, not loud and ranting, it works in the silence, often in the dark; and, in short, science is truth-seeking, cant is self-seeking.

This loud-mouthed ranting of empty heads has done much to throw discredit upon science in the eyes of practical men. But let us remember the distinction we have made, and let us make the application until we have separated the wheat from the chaff.

We have said that science was truth-seeking. That is the kernel of the whole matter. Science in its broadest, widest aspirations seeks to take in the rays of light that stream in upon it from the remotest star in the universe to the nearest, minutest atom of earth dust, and to bring it all to a focus upon its camera. It seeks to reproduce in miniature the great universe about us, so that before its vision it can see accurately photographed each fact and factor in the great whole we call nature. This is science. It is not a mere aggregation of facts. That would be a chaos; but it is an arrangement of facts gained with infinite labor from the top of the Andes to the bottom of the deepest ocean, gathered by men young and energetic, and by men old and worn with years. It is an arrangement of facts so made that they show their natural relationship to each other, the forces at work among them, and the law that knows no breaking. This is what science is. It is our heritage from all the past. It is our store-house for all the future.

Now has industry no interest in this store of knowledge wrested by the work of the best minds that have ever come into existence? Let us see. What would industry be were it to become petrified? It would be what China is to-day. If then progress and improvement are necessary, whence can it come but from a wider, a deeper knowledge of the facts and forces about us. Where can one get that but from science? Here it is arranged, classified, labeled by the hand of some great master.

This is not very new, but it is very true, and we are all liable to forget it in the hustle of the workshop and the field. The practical man has got to look on scientific knowledge as all very well, but he does not see just how it bears on his work. He may agree about all this in a general sort of way, but he does not find the help from science that he ought. What is the result? Ask any one who has been to the Patent Office at Washington, and hear what he has to say on the endless host of men who have wasted years on the perpetual motion phantom. Stop to think for a moment of the wasted brains and hollowness that has been put upon this one mistaken effort. Think again of the additions that might have been made to our industrial resources, if science had directed this energy and capital. Science then is valuable to industry, first, because it avoids expenditure of energy in the wrong direction.

In the second place, science helps in suggesting new fields for inventive and industrial genius. Science, pure science remember, is only the

orderly arrangement of facts. It is not the application of them that is the field of the inventor and the practical man. But let us see what has come to industry from the pure sciences. We do not need to search for illustrations, but rather to omit, there are so many at hand. In the first place look at the work of Michael Faraday, a poor book-binder's apprentice, who devoted his life to the study of pure science without any idea but the love of truth. And behold the result of his labors in manifold applications of his discoveries in the laws of electricity that team on every band. His name like Franklin's is a name to conjure with. Again see how chemistry has made of coal tar dye stuffs that rival the rainbow's hues. But examples are needless. Let us learn the lesson. Let us send our inventors, our miners, our mechanics, our farmers, our children to learn not of loud-mouthed talkers, but of science what is and what is not a possible or a useful combination of force and matter.

Now from general principles to particulars. Here upon this coast we are finding ourselves after the hey-day of abundance just about on the same plane as the rest of the world. The cream has been skimmed, the honey eaten, the gold that grew has been gathered in and the rest of the world has the most of it.

We have now to take up the tools and work as they do if we would compete in the struggle for existence.

In this struggle every aid tells. The rest of the world has the aid of science. We must have it, too. On this coast we have our University that is doing much in this way, and our Academy of Sciences from which we expect much in the future. Besides these there are a few other scientific clubs and societies that are doing something to help on the work.

We need an industrial survey of the State to supplement the geological survey which has so unfortunately gone uncompleted. These institutions should have the attention and the assistance of all friends of progress. For from them alone comes the light that can save us from the communistic torch of ignorance and desperation.

And lastly, there is needed a journal energetic yet painstaking, stirring yet reliable, that shall bring together from far and near what help it can from science for the benefit of our industries. This has been and is the object of the MINING AND SCIENTIFIC PRESS.

For over 15 years it has worked nobly in this direction, against many discouragements. And from our experience of the past we have reason to hope for the future. We intend that in our columns the practical man shall find whatever appears in the scientific and technical journals of Europe or America that has any bearing upon the industries of the coast. We hope to be the first to record the progress of science and art here and abroad. We hope to add suggestions as to the best ways of overcoming the obstacles that are met with in developing our resources. And in furtherance of this, we desire that our readers keep us informed as to their especial needs and of the difficulties they meet with in their mining, metallurgical and other industries, that our work may be mutually advantageous. We believe that every man on the coast will find it to his advantage to have the PRESS where he can reach it.

A Large Silver Mill.

The Pacific Iron Works of this city, have recently entered into a contract with Mr. Wm. H. Cilley for the construction of an 80-stamp silver mill of the best pattern, for the celebrated Cerro de Pasco mines of Peru.

Mr. Cilley was a partner with the late Harry Meiggs in most of his railroad operations in South America, and he and his associates are now completing the contracts entered into with the Peruvian Government before Mr. Meiggs' death, among which was the construction of the Arroya railroad and the development and operation of the mines referred to. This road runs from Lima over the summit of the Andes, and is to connect with the fertile valleys of the eastern slope. It is now completed some 80 miles from Lima, leaving about 70 miles more to build to bring it to the above-named mines. This enormous mill will weigh some 600 tons, and a vessel will be chartered to carry it to the port of destination. As the machinery has to be packed on mules over the uncompleted portion of the road, it will all be made in sections, no piece exceeding 300 pounds in weight. We shall give farther details of the construction of this machinery as soon as practicable.

The Cerro de Pasco mines have been the richest and most famous in the world's history, having produced according to the Government records previous to the year 1826 the enormous sum of \$492,000,000, and were only worked to the depth of 200 feet. They are located in the heart of the Andes at an elevation of 14,000 feet, and some 150 miles east of the city of Lima, and are fully described in "Humboldt's History of New Spain," published in the early part of the present century.

JAMES HENDERSON DUFF, of Toronto, started last week to walk the distance of the circumference of the earth. He proposes to walk 40 miles each working day for two years, which will give him a day over what he requires to accomplish the feat. If he succeeds he is to receive \$10,000.

A New Work on Geology.*

It is seldom that a book comes out so entirely praiseworthy as this effort of Prof. Le Conte. In his preface he modestly disclaims any intention to make an exhaustive manual for the special student, but only to present the elements of the science in a clear way to the cultured and intelligent student. This and more he succeeds in doing, as we shall see.

The study of the life and development of our globe is one of the most interesting, and at the same time important fields to which man can turn his attention. It is interesting to the merely general student as a means of culture, but to the special student and the miner it becomes at once a matter of the very first importance. There has been a great deal done in the way of thorough geological work both in this country and in Europe by the most distinguished scientific men. But the records of their work have been only accessible in the files of scientific societies, scattered through long years, and frequently in foreign tongues, so as to be inaccessible to the ordinary reader. In the way of a comprehensive treatise upon the subject there has been nothing in the English language of any real value except the "Manual of Geology" of Prof. Dana, and the "Elements of Geology." But both of these books, especially the former, is rather a hand-book for the special student than an introduction to the science. The chief objection to the latter, apart from its arrangement in two large volumes, is the fact that its illustrations are chiefly drawn from European geology, thus putting an inductive study of the science out of the reach of the American student.

Prof. Le Conte felt this want in his course of instruction in the science, and was compelled to thoroughly rework the ground in a course of lectures for his students. This course of lectures, the result of many years of careful study and arrangement of the large mass of work which has recently been done in this science, is the subject matter of the present work. It has been long looked for, not only by his students, but by all interested in imparting instruction in this department. It is addressed to those who wish a clear and scientific account of the present state of the science without going into its minute, and also as an introduction to further study on the part of the specialist. It certainly fills this field better than any other book it has been our fortune to meet.

It is a handsome large octavo volume of nearly 600 pages. It is clearly printed, and is illustrated by over 900 excellent wood cuts taken from the original sources, and the whole work reflects great credit upon its publishers.

The arrangement of the work is something noteworthy. The Professor takes up first

Dynamical Geology.

He considers the agencies of the atmosphere, the water, the internal heat of the earth, and organic influences. These subjects are handled with a master hand, as we shall more particularly notice again.

Having fully developed this part of the work, to which are devoted 162 pages, he takes up

Structural Geology.

He considers the general form of the earth, stratified or sedimentary rocks, unstratified or igneous rocks, metamorphic rocks, structure common to all rocks, and denudation or erosion.

Under the head, "structure common to all rocks," he considers joints and fissures, mineral veins, mountain chains, their structure and origin. To structural geology he devotes 100 pages. Lastly he treats of

Historic Geology.

Or the history of the evolution of earth-structure and of the organic kingdom. In this, which occupies the remainder of the work, it is remarkable to see how interesting the Professor has made it by keeping the idea of evolution constantly before the mind of the reader. It serves as a thread upon which are strung a long series of most interesting studies, and, taken as a whole, it leaves a most convincing impression upon the mind of a reader.

We wish we had time to call attention to the manner in which certain subjects, usually slighted in works of the present nature, are presented. We refer to the sections on "ice and glaciers," "chemical agencies of water," "volcanoes," "geysers," "earthquakes," "coral reefs and islands," "mineral veins" and "mountain chains" for illustrations. All these are supported by facts from the latest observations, and, as presented, are brilliant illustrations of the inductive mode of reasoning, which it has been the peculiar privilege of modern science to develop.

We can cordially recommend this work alike to the general reader for profit and pleasure, as well as to the miner and special student, as something that will give him an excellent introduction to more special study.

There has been so much question as to Prof. Le Conte's position on the question of evolution that perhaps some of his friends might like to hear him on this point. We quote from an address of his delivered before the Chit Chat Club of San Francisco last November.

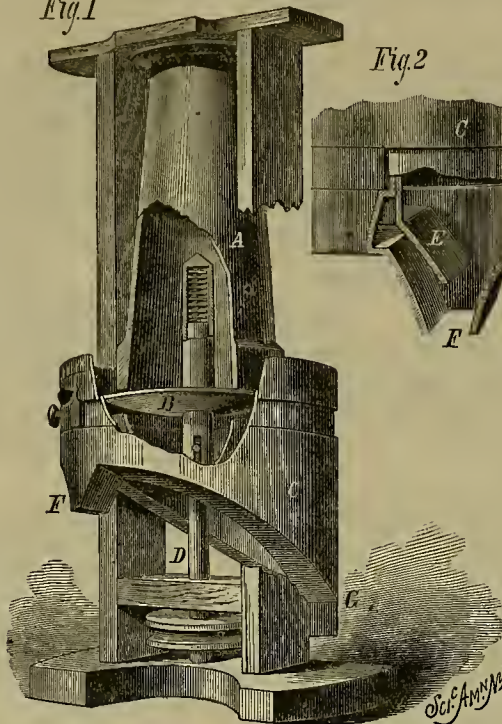
"First of all I wish frankly to acknowledge

that I am myself an evolutionist. I may not agree with most that evolution advances always *cum equo pede*. On the contrary, I believe that there have been periods of slow, and periods of rapid, almost paroxysmal evolution. I may not agree with most that we have in Darwinism, the final form, and in survival of the fittest, the prime factor of evolution. On the contrary, I believe that the most important factors of evolution are still unknown; that there are more and greater factors in evolution than are dreamed of in the Darwinian philosophy. Nevertheless, evolution is a grand fact, involving alike every department of nature; and more especially evolution of the organic kingdom and the origin of species by derivation must be regarded as an established truth of science."

In concluding this address there are a couple of sentences which we cannot resist the opportunity to quote. Speaking of the dogmatism which exist not only in theology but also in science sometimes, he says:

"The old is credulous of old ideas and skept-

Fig. 1



VITTI'S PATENT GRAIN TOLLER.

tical of the new; the new is skeptical of old ideas and credulous of the new. Both deserve the unsparring rebuke of all right-minded men. The appropriate rebuke for the old dogmatism has been put in the form of a bitter sneer in the mouth of Job—'No doubt ye are the men, and wisdom shall die with you!' The appropriate rebuke for the new dogmatism, though not put into the mouth of any ancient prophet, ought to be uttered. I will take it upon me to utter it here. I would say to those modern materialists—'No doubt ye are the men, and wisdom was born with you!'"

The Alexander Windmill.

A self-regulating windmill, which demands attention because of the exceeding simplicity of its mechanism and resulting advantages, is the Alexander mill, which is shown on this page. The engraving shows all the machinery there is about the self-regulating apparatus. The radical point of the invention consists in splitting the fan lengthwise, fastening the parts together by hinges and holding the movable fan up to its work by a coil spring. When the wind blows very hard the spring yields and the movable part of the fan turns back. In a gale of wind it rests at such an angle that the force of the wind upon it exactly balances that upon the fixed half then, and the mill stops. Half its surface is exposed to the force of the wind, and that half at an angle, leaving ample room for free passage of air. As the wind slackens, the spring draws the fan into place and the mill resumes its work.

We have seen numerous testimonials of those who have tested the mill and speak in its favor. M. M. Odell, of Sacramento, who has had one running through all the storms of last winter, endorses all that is claimed for it. Roht. Williamson, of the Capitol nursery, is very well pleased with his and said it would run four such pumps as his. Other points are made in letters of other users.

It is said that steam as a motor will be discontinued on the Philadelphia street railroads after nearly a year's trial, on account of the wear it causes the rails, necessitating their frequent relaying. Otherwise it gives entire satisfaction.

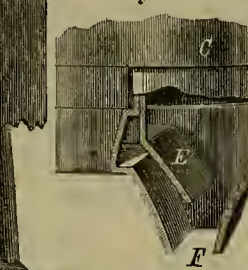
PROF. HILL is about removing his extensive smelting works from Black Hawk to Denver, to secure greater variety and better supply of ore.

Patent Grain Toller.

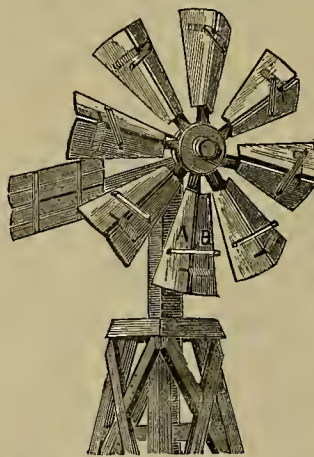
The annexed is an illustration of an improved mechanical grain toller designed for use in custom mills for the purpose of taking the toll accurately and without trouble to the miller. It may be readily adjusted to any proportion of toll as may be agreed upon.

A is a conducting tube, through which the grain passes down upon the slightly concave revolving disk, B. The latter is lowered by the pressure, and the grain gradually escapes between the lower end of the tube and said disk, and enters the annular casing receptacle, C. The tube, A, Fig. 1, is slightly increased toward the lower end, so as to let the grain down with less friction on the sides of the tube, and consequently to enable it to exert more pressure on the disk. The latter has a central tubular portion, which is connected by a comping pin in the shaft, D, which is rotated. The

Fig. 2



upper part of the tube is closed and a spiral spring is provided therein, so that the disk may freely play up and down while revolving. The disk adjusts itself to the pressure of the grain and automatically regulates the opening and outlet, according to the quantity of grain coming in at the top of the machine. The spring, by yielding, allows the disk to work as well



Alexander's Self-Regulating Windmill.

with an irregular as with a regular flow, and can be used equally well in tolling the grain from an elevator or from a hopper.

The casing, C, is arranged with two vertical partitions, one of which, E, Fig. 2, is movable, and is adjusted by a set screw, face plate, and index along the graduated scale on the exterior of the casing. The partitions, when adjusted to the proper distance, take up a certain fixed proportion of the circumference of the disk, and receive, by the uniform dropping of the grain over the edge of the disk, a corresponding proportion of the grain passing down the tube, A. This forms the toll agreed upon between the miller and the customer, and it is conducted through an exit spout, F, to a suitable receptacle. The main portion of the grain passes along the spirally inclined bottom to a second exit spout, G.

The first model machine made by the inventor has been in practical use in Vitti's Steam

Mills, at Union, Mo., over a year, without requiring any attention whatever, doing its work satisfactorily to both miller and customers. The toller is about 18 inches high, and the base about 10x5 inches. For further information address the inventor, Adolphus H. Vitt, Union, Franklin county, Missouri.

The Old Districts, and the Lessons they Teach.

In looking over the various mineral-bearing districts one is impressed with the generally healthful and hopeful condition of mining affairs on this coast. The first thing to be noted in the aspect of this business is the growing disposition to pursue it in a practical and economical rather than in a speculative and wasteful manner. The change that in this respect has been wrought within the past year or two is marked and general. Hundreds who, a short time ago, thought of nothing but investing in stocks, intent only on "getting points" and watching the fluctuations of the market, are now directing their attention to the other branch of the business, inquiring where are to be found the best openings for a safe and permanent investment, or the inauguration of a practical mining enterprise. Even those who continue to dabble in stocks speak of the calling in a doleful and despairing way, indicative of a greatly lessened assurance in its future. Confidence in the potency of mere manipulation is not nearly so great as it was. Operators are not heard to assert with the frequency and shameful sang froid of former times, that they know but little and care less about the actual merits of the mines themselves, this being an element that very rarely entered into their calculations. The character of the property whose shares they are handling is regarded as of more consequence now than formerly, and we predict that it will not be safe for dealers to so wholly ignore this consideration hereafter. Evidently stock operations must rest on a sounder basis, and be conducted in a more legitimate and business-like manner or they cannot go on.

But it was of mining in the field that we set out to speak about, and in this it is that the most obvious improvement has of late taken place, and it is an improvement that goes both to the modes of carrying on the business and to the mines themselves. As regards the latter, the evidence is found in hundreds of old and new camps all over the country. From every State and Territory along, and west of the Rocky Mountains, comes assurances that the bullion product of the present will exceed that of the past year, this excess in the case of some being very considerable. And this gain will not be restricted to these advanced figures nor confined to the present season. In most instances it may be expected to increase steadily, and to hold through a long series of years.

The countries that may most confidently be counted upon for an immediate and decided increment of their bullion production are Dakota, Colorado, Utah and Arizona, with some increase also in Nevada, California and Montana, and very likely Oregon, Idaho and New Mexico. What alone threatens to check production in Nevada is the interruption of ore extraction from the Cen. Virginia for a couple of months, and perhaps for a longer period, now determined upon. This will, however, be in part made up by the out-put of several other mines now coming into active production in that State.

What constitutes a specially encouraging feature of this branch of our subject is the great number of mining locations, and, even entire districts, that, after having struggled along for years with but indifferent success—some of them having been abandoned as hopeless—are now beginning to show signs of large mineral wealth, a few having already become active shippers of bullion. It is true, a majority of these old camps still remain under the cloud that so early obscured their horizon, and which from some of them may never wholly lift. Others, through the aid of capital and a more judicious application of labor, will, probably, show productive capacities equal to those which have already begun to yield the precious metals in notable quantity. In these localities that, after suffering a temporary decadence, have since begun to distinguish themselves in this particular, Nevada, Utah and Colorado are especially prolific.

All over these countries are camps that, starting out with brilliant prospects, and, enjoying a delusive prosperity for a brief period, declined afterwards almost to the point of industrial extinguishment, and so remained for a number of years, but which latterly have begun to recover, and promise soon to take respectable rank as bullion producers. At another time we will take occasion to speak more particularly of these resuscitated districts, pointing out the useful moral they convey to the practical miner, nearly all who had the courage to hold on here, having in the end fared well, some of them being already rich.

Nor disheartened at the failure of their first attempt, the Schively Bros. have built a new reverberatory furnace at Truckee, and are experimenting upon base metal ores, having already made a partial success.

The product of Hurst, Haggin & Co.'s Ontario mine in Utah for 15 months was \$2,299,800. The mine is better now apparently than ever before.

* "Elements of Geology." A text book for colleges and for the general reader. By Joseph Le Conte, author of "Religion and Science," etc., and Professor of Geology and Natural History in the University of California. N. Y.: Appleton & Co., 1878.

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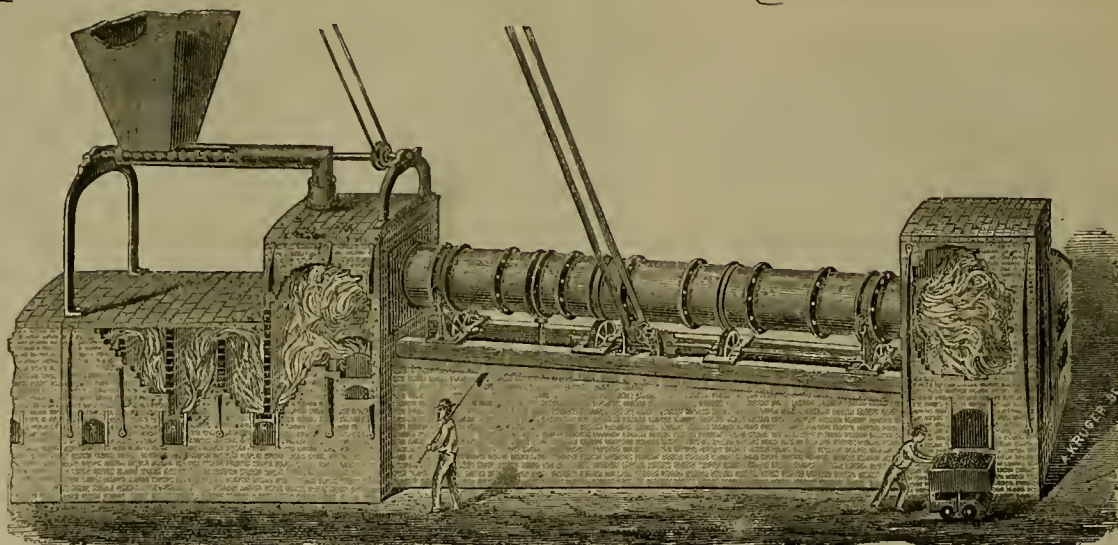
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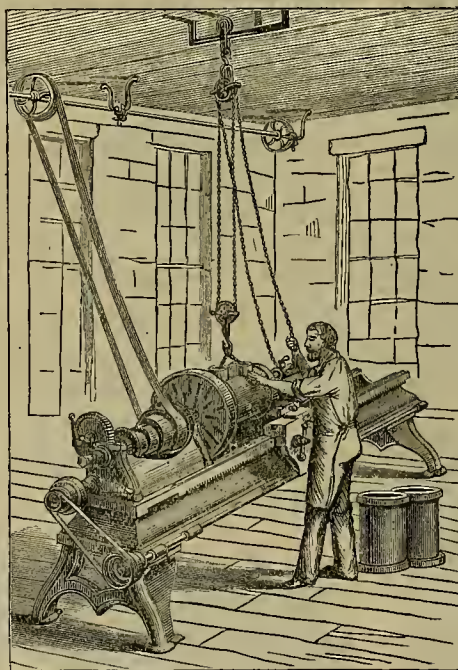
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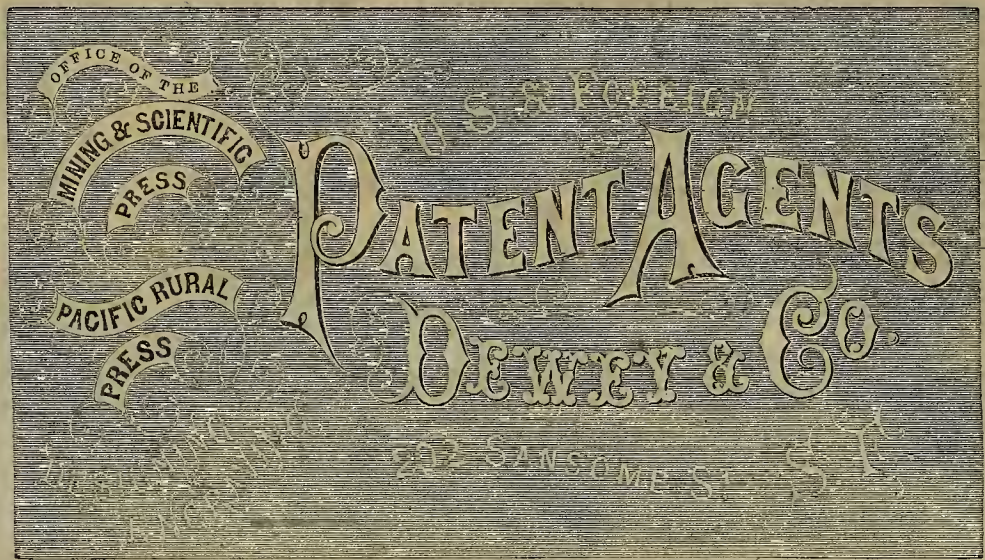
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Testing and Working Silver Ores.

The above is the title of an illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron, which has just been issued by Dewey & Co. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope:

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working same, appliances for testing, roasting, etc. Under the heading of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the heading of "Leaching Processes" are the titles, Smelting, Mexican process, Chilean process, Kroehnk's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

The book is a serviceable one for miners and prospectors' use. Price, post free, \$2.00. Address Dewey & Co., MINING AND SCIENTIFIC PRESS, 202 Sansome Street, San Francisco.

TO QUERISTS.

In propounding questions to the editorial, patent or business departments of this office, letter writers should be careful to enclose a stamp and addressed envelope if they wish prompt answer. If we were to furnish time, paper, envelopes and stamps, ALL free to parties who address this office on matters of more interest to themselves than to us, FIVE HUNDRED DOLLARS A YEAR would not cover the expense. This hint, however, is not intended for parties writing in our own or the public interest, or who would be obliged to delay writing at any time for want of an extra stamp.

SETTLERS and others wishing good farming lands for sure crops, are referred to Mr. Edward Frisbie, of Anderson, Shasta County, Cal., who has some 15,000 acres for sale in the Upper Sacramento Valley. His advertisement appears from time to time in this paper.



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Mr. W. J. WOOLLEY, who took out a Canadian Patent some four years ago, is requested to call at the MINING AND SCIENTIFIC PRESS PATENT AGENCY OFFICE. Business of importance.

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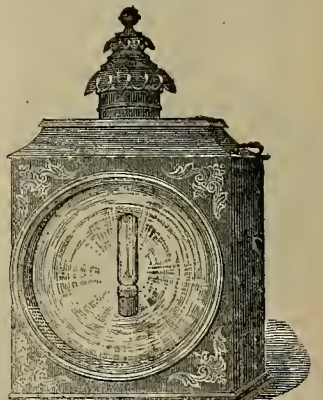
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MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, MAY 18, 1878.

VOLUME XXXVI.
Number 20.

The Speaking Telephone.

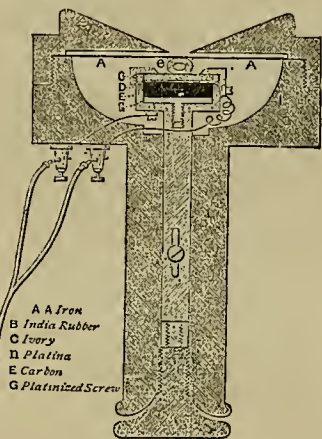
Great progress has been made in the introduction and application of the telephone to the practical uses of intercourse and communication since we gave a description of the Bell instrument some months ago. The workings of the instruments have been improved, and great advances have been made in methods of making them useful. Other inventors have brought out telephones which are coming into wide popularity because of their excellent qualities.

We show upon this page engravings of two telephones. One is the invention of Thomas Edison, who has achieved widest fame by his phonograph, which we expect soon to illustrate and describe. One of the main features of the Edison telephone is the employment of a carbon disk for the purpose of varying the strength of a battery current in unison with the rise and fall of the vocal utterance. He found that by vibrating a diaphragm with varying degrees of pressure against a disk of carbon, which is made to form a portion of an electric circuit, the resistance of the disk would vary in precise accordance with the degrees of pressure, and consequently a proportionate variation would be occasioned in the strength of the current. The latter would thus possess all the characteristics of sound waves, and by its reaction through the medium of an electric magnet, might then transfer them to a metallic diaphragm, causing the latter to vibrate, and thus produce audible speech. Our engraving, which is copied from one lately given by *Scribner's Monthly*, shows the arrangement of the parts of the transmitting apparatus of the Edison telephone. The carbon disk is represented by the back portion, *E*, near the diaphragm, *A*, placed between the two platinum plates, *D* and *G*, which are connected in the battery current as shown by the lines. A small piece of rubber tubing, *B*, is attached to the center of the metallic diaphragm, and presses lightly against an ivory piece, *C*, which is placed directly over one of the platinum plates. Whenever, therefore, any motion is given to the diaphragm it is immediately followed by a corresponding pressure upon the carbon and by a change of resistance in the latter, as described above. It is obvious that any electro-magnet, properly fitted with an iron diaphragm, will answer for a receiving instrument in connection with this apparatus.

Another telephone which is coming into wide use, is that invented by Mr. G. M. Phelps. The peculiar excellence of Mr. Phelps' instrument is said to consist in its distinct articulation, combined with a loudness of utterance that is not to be found in the many other forms which have been thus far brought forward. The form designed by Mr. Phelps is shown in our engraving. It consists of a polished case of hard rubber or rosewood with magnet coils and diaphragm inside. In connection with this telephone there is used a small electro-magnetic machine, contained in an oblong box, which is used as a call bell when the attention of a distant station is required. The currents which are generated by this machine by turning a crank, are conveyed by the conducting wires through the helices of a polarized magnet, or relay, and cause a hammer attached to an armature lever to vibrate against a bell, thus producing a violent ringing, sufficiently loud to be heard at a considerable distance from the machine. The points of description, which we have taken mainly from *Scribner's* detailed article on the subject, are of particular interest, because of the great numbers of this style of telephone which are being introduced in this city.

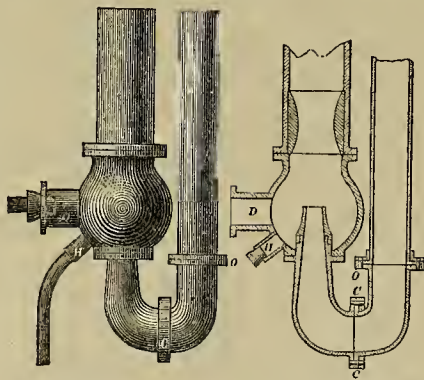
The use of the telephone in this city has been marked by the character of enterprise which usually attends the introduction of progressive inventions among our wide-awake people. The American District Telegraph Co. have furnished a large number of the instruments to private parties, and they have given the use of the telephone features which were original with them, but which from their plain advantages are now being introduced in other cities. Notable is the arrangement called the "central system." At their establishment on Sansome

street, near California, they have a telephonic department under the management of Mr. Sabin. In this room each wire from the distributed telephones centers. If the owner of a telephone wishes to communicate with another owner in any part of the city he signals or calls the central office, and his wire is connected with that of the other party. There are now 100 firms centering in this office and each one can thus, at a moment's notice, be put in communication with any one of the 99 others. Thus any firm can communicate with another as man would speak with man, as the message goes direct without even the intervention of an operator. When a firm is called from the central



EDISON'S TELEPHONE.

office they are told the name of the party who addresses them by the central operator, so there would be no chance for the telephonic impostor to impose on one another by calling wrong names. Each firm is furnished with a schedule of all the others which are in communication with the central office. As we have said, the manifest advantage of this centering idea is so great that the great cities at the East are thinking of following the example set them by the enterprising company in San Francisco.



CRANSTON'S HYDRAULIC WATER LIFTER.

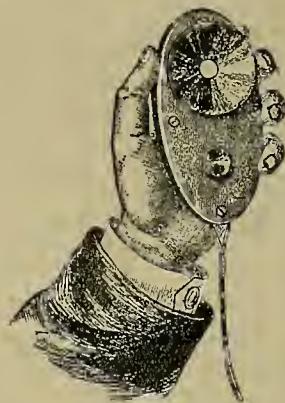
Our coast is kept well abreast of the progress in the adaptation of electro-magnetism to common uses by our skillful home firms which make a specialty of this branch of work. Besides the American District Telegraph Company which we have mentioned, there is the California Electrical Works which is cognate in its sphere. The gentlemen in charge of this company are second to none in the country in their peculiar profession. In the application of important discoveries abroad and in original discovery and invention they are wide-awake and successful.

ON FILE.—We have several illustrations on hand which will shortly appear. Among them Pictet's Ice Machine, Root's Rotary Hydraulic Engine, Blake's Pumps, etc., the Phonograph, Edison, the inventor, etc.

Cranston's Hydraulic Water-Lifting Machine.

The accompanying engraving represents a hydraulic water-lifting machine recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by Geo. W. Cranston. The main object of the machine is to go in combination with the Cranston Hydraulic Elevator for the purpose of setting or sinking in watery locations, where there is no drainage.

The elevator we have previously described and illustrated. It is simply a closed flume,



PHELPS' TELEPHONE.

into which is directed a hydraulic nozzle, the force of the water driving the gravel up hill. It is intended for working gravel deposits which lie too low to be worked by bedrock tunnels. It has been found difficult in certain places to get the elevator down to the proper level to work in mines; and in case of accident the elevator has been so covered with water that it was difficult to get it out for repair. In such cases the water-lifting machine, herewith illustrated, is very useful. The machine can also be used

bas a strong suction or draft when it is used drawing water or dirt. When used in combination with the elevator, as a sump or drain, the machine is generally placed at the bottom of the shaft, somewhat lower than where the elevator is situated, so as to drain everything into it, and can be driven by a branch pipe taken from the main pipe that drives the elevator. It must have a cut-off or gate to shut off the water when not in use. This machine is not required to run while the elevator is in operation, for the elevator is a sufficient drain; but, as above stated, is only required when the elevator is not running. The machine is small and light, easily set and moved, is not costly, and requires but little water to run it.

Two sizes are made; No. 1 requires from 40 to 80 inches of water to drive it and costs \$250. No. 2 uses from 60 to 120 inches of water and costs \$400. Further inquiries may be made at the Hydraulic Gravel Elevating Co.'s office, at Joshua Hendy's, 51 Fremont street, S. F.

Foundry Notes.

During the past two weeks business among the city foundries and machine shops shows some slight improvement, work at some of these establishments being more active now than for several months past. At the Pacific Iron Works they have a number of silver and gold reduction mills in hand. The 80-stamp mill being built here for the Cerro del Pasco mines in Peru, is being rapidly advanced, a large force of hands being employed upon it. At these Works they are also constructing a 10-stamp steam mill for the Golden State company of Arizona—nearly completed. The plant for a heavy sugar mill to go to the Sandwich Islands, a couple of large chloridizing furnaces for the White & Shiloh mine, Eastern Nevada, and two of the Howell furnaces for the Alice mine, Montana, have just been finished. Have also recently turned out one of the Gerrish air jackets for the Eureka Con. mine, Nevada, and a 10-stamp mill for the Constancia mine, near Guaymas, Mexico. They are executing many small orders here. The number of hands now engaged being larger than for 12 months before.

At the *Atma* they are busy on an extensive repairing job on the steamer *Great Republic*; also various jobs of this kind on flour mills, saw mills, etc. At the *Fulton* they are constructing 16 boilers, several of them of large size, some being intended for steamships and others for stamp mills, dredgers, etc. Having lately completed one of the new style of dredgers intended to operate on the rivers in the gold regions of this State, they are now getting up another of these machines, into which some needed improvements have been introduced. This machinery, aside from the boat on which it is placed for operating, costs from \$12,000 to \$15,000. They are building here a compound engine for a steamer to run between the larger islands of the Sandwich group; a five-stamp mill for the Extra mine, Shasta county; two steam launches—one for Victoria, B. C., and the other for Central America. Of the larger boilers being constructed here, six are for the Meiggs' Lumber and Shipbuilding Company, and four for the Star Flouring Mills, at Vallejo.

At the Golden State and Miners' Foundries several steam crushing mills, carrying from five to ten stamps each, are in course of construction; also two of Knox & Osborn's furnaces for the Sulphur Banks Quicksilver Company, and quite a large number of the *Fine* concentrators, a machine that seems to be coming into considerable use, and for the building of which this establishment has had many orders.

THE GILA MINE.—This is about the only property that for many years has served to keep any life in the old Revelle district, southern Nevada, and for a time this has been under a cloud, the fine ore body found in this mine several years ago having been exhausted, since which only exploratory work has been in progress here. The Gila, it appears, is in bonanza once more, with a much more promising outlook than ever before, the mine carrying a 3-foot stratum of ore, that assays \$348 per ton, with much besides of a lower grade. The company expect to resume paying dividends at an early day.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds

Esmeralda District.—No. 2.

Its Location, Past History, Geological Characteristics and Revival of Affairs.

In August, 1860, one of the most important discoveries ever made on the Pacific coast took place about 100 miles in a direct line south of Virginia. The location was for several years believed to be in Mono county, California, but the final survey threw it into Nevada, a distance of about three miles, at Aurora, Esmeralda district, after which the county was named, was organized on the 30th August, 1860, J. M. Braly, J. M. Cory and E. R. Hicks being the discoverers. The two former are residents of Santa Clara county.

There was no special excitement over the discoveries until the winter of '62-3, when the wildest sort of scramble ensued and raged for about 18 months, materially subsiding during 1864, by which time no less than 17 quartz mills were erected, 10 of which were still in operation. Three of these structures cost in the neighborhood of \$200,000 each—the Wide West and Real del Monte more particularly; the Antelope, a fine brick structure still remains to tell the tale. All the others of consequence being torn to pieces and carried away or scattered about the district in piecemeal. The town of Aurora, containing at one time from 6,000 to 10,000 inhabitants and many fine brick buildings, shared a like fate, hundreds of old chimneys and the like evidences of former prosperity marking the site formed at the junction of the ravines pertaining to Last Chance, Middle and Silver Hill, on which the bulk of the miners were located, Last Chance being the scene of wildest excitement. Mt. Braly is the holdest landmark and looms up south and west of Silver Hill to a height of near 10,000 feet, the town site being over 8,000 above sea level. The lowest estimate places the hullion product of Esmeralda district, first and last, at \$12,000,000, most of which came from half a dozen mines, of which the Del Monte, Wide West and Antelope were most conspicuous; the Utah, Ural, Empire, Cortez, Young America and others also contributing their share. The work of ore extracting on any scale worthy of note mostly ceased in 1865, but more or less crevicing or "coasting" was done up till 1868, when everything but the county seat and post-office was lost sight of by the outside world. This superficial mining resulted in leaving the old shafts and tunnels, that never had any systematic shape, in such a condition that anything like a satisfactory examination was out of question.

The formation of the district is as perfect as that of the Comstock, the surface croppings being more bold as well as richer, excepting that pertaining to Last Chance and Silver hills, where the displacement is considerable. Middle hill, which excited least attention during the early excitement, shows rich croppings and a formation that is generally regular. The "country rock" is hirsute porphyry, the quartz being gold and silver-bearing, the bullion rating at from \$5 to \$7 per ounce. The ore is free milling, and generally yields \$75 per ton on the average; much of it going up into the hundreds, and more or less even into the thousands. No doubt exists concerning the loss of millions of dollars through the ignorance of amalgamators during the flush times of Esmeralda, the metal floating off down the creek in the tailings, none of which were ever saved.

There were two leading causes for the decline and neglect of the district: ignorance of deep mining on the part of all interested in those days, coupled with the exhaustion of the surface deposits on the Comstock, and the extensive and costly litigation to which most of the leading companies became subject. Adverse claims were set up all about and overhead, until confusion worse confounded drove stockholders desperate, and the result was a complete stoppage of work and great loss. W. C. Ralston never gave up the idea of more thorough development, and in 1872-4 inaugurated what looked like a promising revival, but owing to his great operations and complications on the Comstock and somewhat tragic demise, the ultimate development of Esmeralda devolved upon others.

This brings the outlines of matters down to 1877-8, and following in the wake of the revival in Bodie, when a new departure was inaugurated which gives promise of great things. During Ralston's regime the Juniata company secured a patent for a large section of ground, chiefly confined to Last Chance hill, and including all the old Del Monte, Wide West, and the like croppings. Out of this patent the new Real del Monte ground was segregated (1,000 feet square), a company formed and new operations on the modern plan begun. A new three-compartment shaft, with hoisting works erected, capable of sinking it 1,500 feet was started last December. A depth of nearly 350 feet is reached, and the work is being pushed night and day. The location of this shaft is made with respect to the probable real line of the fissure, if any exist. The surface or middle hill is suggestive of three great fissure veins through the belt; but that there

must be at least one great source below from which these wonderful croppings come there can be no reasonable doubt for a moment. Should this great shaft, with proper drifts, crosscuts, etc., fail to open up another Comstock, that impression will still remain, and other shafts by the same, or other companies, will be sunk sooner or later. The new Del Monte company are well able to carry out a system of works throughout the district, which would test it thoroughly, but let them once strike an old-fashioned bonanza on Last Chance hill, at a depth consistent with modern explorations, and there will be no end to the capital and intelligence ready for any emergency. Things have reached such a state on the Comstock that all eyes are being turned to other fields, and no place outside of Bodie and within range of the Comstock, is so suggestive of big things as Esmeralda.

Aurora affairs are very much brightened up, and should the indications of rich deposits increase in the new shaft, as of late, there may be more than a ripple of excitement created ere the summer is over. The old houses of various kinds are generally furnished up and in demand, and certainly afford a timely shelter for a goodly share of the small army of adventurers attracted towards Bodie; Aurora being only 10 miles from that place. J. W.

The Remedy for Hard Times.

[Written for the Press by EDWIN BERWICK.]

"What's your remedy for hard times?" was an enquiry put by your correspondent yesterday to an intelligent neighbor.

"Economize!" was the laconic reply. Every one of course has some pet panacea for surmounting the difficulties that beset "the labor question," but I incline to agree with my neighbor, that the true remedy is the old remedy. "Go to the ant," thou laborer, "consider her ways and he wise, who, having no guide, overseer or ruler, gathereth her food in the summer and layeth up her stores in the harvest."

By the bye, let me protest, before proceeding further, against the arrogation to themselves exclusively of the title of "working men" by day laborers and hired hands. Are not twelve men out of every thirteen *working men*? Does it follow because a man has brains enough to find employment for himself, without looking to a "boss" to direct his powers, that he ceases to be a working man?

There are men totally unfit to follow the plow or carry the hod, all day, that work just as hard, and as honestly, as hod-carriers or plowmen.

One of your correspondents appears to think that machinery is making work scarce. I am bold to affirm that there is no superfluity of labor in the world. All that is needed is to direct labor into the proper channel. Machines will never pick strawberries or prune peach trees. So long as one acre of land in the world is only half cultivated, there is no need to talk of working half time.

If there is a surplus of mechanics in the towns, let them betake themselves to the foot hills, as you suggest. An acre in garden stuff will almost keep a family, and a cow well managed will yield \$50 per annum. Of course many will feel like fish out of water, hard put to it to make a living. There will be at the outset much failure and much privation, but when a man can get enough beans, corn, potatoes and greens, with a few eggs and a little milk, and hutter, with the prospect of fruit ahead, he ought to be able to wear through some years of close living.

Any man who has not the brains to mark out some line of business for himself, finds in the capitalist the very friend he needs. The laborer wants the capitalist, his occupation without the capitalist is gone.

What he does not want is that spirit of extravagance, which continually demands "flush times," and lavishes, on superfluities and vices, the money that should be prudently hoarded for "hard times."

That Paint of Ours.

EDITORS PRESS:—Your spicy article, written under the inspiring influences of new carpets and Averill paint, inspires a few thoughts in sympathy with your remarks. "Cleanliness is godliness." So says the good book, and I fully believe in the statement. A man's surroundings governs his every thought and many of his acts. The pure and the beautiful is elevating. Filth is depressing, and induces a state of mind antagonistic to the creation of high thoughts or noble deeds. We congratulate you on your altered condition, showing that you are blessed with wide-awake governors; may the editorials prove the virtue of paint and crystal skylights. No excuse now for dingy dishes being served up to the many readers of the RURAL.

I too am in the midst of renovation. Mt. Pleasant must keep its name good. So we espied the advertisement of the California Paint Company in the RURAL; we gave our order and a supply is somewhere on the way. This Averill paint is becoming popular for its intrinsic value. Not like many patent nostrums; it requires only to be used and seen to bring it into favor.

JOHN TAYLOR.

Mt. Pleasant, Tuolumne Co., Cal.

Coinage at Our Mints.

How the Silver Dollars are Made.

The law of February last, requires that from two to four million dollars shall be coined every month. As our mints have a maximum capacity of but three millions per month, this must be the limit, unless additional facilities for coinage are furnished. There will be no lack of metal even if the coinage should reach the largest figure allowed by law, and we depend wholly on home sources of production for a supply, as the mines on this Coast will turn out at least \$50,000,000 of silver this year.

There are two coining mints besides the one in Philadelphia; one in San Francisco and the other in Carson City; assaying and refining being done at Helena, Montana; Boise City, Idaho; Denver, Colorado; and at a few other points in the far West. The Philadelphia mint is capable of turning out about \$1,500,000 in coined money a month; the San Francisco mint, \$1,000,000, and the Carson City mint, \$500,000. The mints cannot, of course, be given over exclusively to the coinage of silver dollars. The subsidiary coins must be struck, and a certain amount of gold coinage goes on all the time. Gold is needed by the Government to buy silver with, aside from all other purposes. It is coined mostly in the form of double eagles.

Silver is sent from the assay office to the mint pure, or 999 fine, which is about as pure as can be. And when received is melted and alloyed with copper. Coin silver is 900 fine. After being melted and alloyed, the metal is cast into ingots which are assayed to determine whether it is exactly of the standard fineness, after which they go to the coiner and are rolled into strips, being annealed to prevent their becoming brittle. Next these strips are run through cutters which divide them into drafts of proper thickness for the coins; in which are run through a steam punching machine which cuts planchets the proper size for the coin.

These planchets are then carefully weighed, the light ones being cast aside and the over heavy ones filed down. This is a delicate process, and is done by women, the scales used being sensitive to one sixty-fourth of a grain. After the adjusting is finished, the next operation is the milling, which is done with a curious sort of machine. The edges of the coin are thrown up and grooved by this process. After cleaning with sulphuric acid the coins are ready for the die. The stamping is done on a screw press, both sides being stamped at the same time. The dies are cylindrical blocks of steel, upon which are carved the designs to be transferred by pressure to the coin. Two or three blows in the screw press, which is worked with a large wheel, secures a perfect impression, and both the obverse and reverse of a coin are struck at once. Machinery places the planchets between the dies, and afterwards drops the completed coin in a box. Two or three pieces of each coinage are reserved for the annual government assay.

The process of melting, refining and assaying gold and silver are carried on in the assay office, in this city, on quite as large a scale as at the Philadelphia mint.

Gold is always found alloyed with silver, and it is never found with any other alloy. To separate the silver from the gold, the hullion is hoiled in sulphuric acid, which removes the alloy; the gold is then rehoiled and reduced to a coarse powder resembling clay. Its purity is 998 or 999. The silver, mixed with copper, is run into vats, on a lower floor, and is purified and granulated, when it resembles pipe-clay. The granulated gold and silver are pressed into large cheeses in a hydraulic press. A cheese of gold, 12 inches in diameter and three inches thick, is worth \$20,000; a silver cheese of the same size is worth \$900. The vitriol and the weak acid are both sold for as much money as the original acid costs. Depositors receive their gold and silver separately at standard purity, 900. Pure metal is also sent to the assay office from the various refineries to be alloyed. From United States refineries silver is generally sent in large bars or cakes, and a small amount of Mexican metal is received in thin, irregular shaped pieces, called disks. The fumes from the vats and furnaces in the assay office are condensed and sold as weak acid. Only a small amount of gas escapes into the atmosphere, and although it is slightly offensive, it is not injurious. On the contrary, this gas is an excellent disinfectant, and acts upon dead matter rather than upon the living. The same precautions are taken to prevent loss in the assay office as in the great mints. The ashes, the sweepings from the floor, the crucibles and all the instruments which come in contact with the precious metals are washed and ground in a machine constructed for the purpose, and the stray particles of silver and gold are gathered together.

JORDAN CREEK MINES.—J. T. Galatin, writing from these mines, in Lemhi county, Idaho, says the quartz lodes are extremely rich. The miners ship their best ores to Salt Lake at a cost of about \$100 per ton. There is plenty of good milling ore in the camp that will not pay to ship. Mr. Galatin says: "A man with money could make a fortune by bringing a mill here." It was in this Lemhi country that the Mormons obtained the gold coined by them in early times.

A Cheap and Perfect Electric Light

Some two years ago, J. B. Fuller, of New York city, invented an electric machine for telegraphic purposes, and with which he continued to experiment with a view to the production of a more perfect electric light, an end that, according to the *Sun*, he has finally succeeded in doing, a very successful exhibition thereof having lately been made in that city. A small steam engine furnishes the motive power for the machine, which is very simple, consisting of an armature revolving between the poles of a powerful electric magnet. A strong current of electricity is thus generated. Two electric wires are attached to the machine, and they convey the electricity to the various burners. Each of these burners consists of two sticks of carbon, separated by a piece of glass, which are attached in an upright position to the wires. The electricity is ignited by the application of an ordinary piece of metal to the burners. The light thus produced is dazzlingly brilliant and very beautiful, so far surpassing the ordinary gas light that the latter looks yellow and dirty beside it. Any number of lights may be supplied by the same wire, and Mr. Fuller has succeeded in so subdividing the current of electricity that any of the lights can be extinguished without affecting in the slightest degree the other lights on the same circuit. This had not been accomplished before. Mr. Fuller says he can light buildings in any part of the city by extending his wires to them through the streets. He also says he can light the streets with electricity, and to prove this he has stretched his wire to a post on the sidewalk in front of the building, where he keeps a light burning every evening. This light is far more brilliant than any calcium light, and illuminates the street for a block. One of these lights would illuminate a whole block, and far better, too, than a dozen or more of street lamps. In lighting up a house, porcelain or ground-glass shades are used for softening the glare of the light. The cost of production is very slight, much less than that of the ordinary gas.

The Planchas de Plata.

The Planchas de Plata country is experiencing a mining revival. It lies a little south of the Arizona line, and west of the Tubac and Magdalena wagon road. The highest strikes have been made about 11 miles west of Agua Sarca, and Mexicans are pouring in there by the hundreds. They are just beginning to get over the paralysis of terror with which the Apaches had so long inspired them. This is why prospecting in that region has now been resumed after a cessation of nearly 100 years. Lorette, our Supervisor, was down there in 1869-70, and has ever since told big stories of mineral he saw there. Out of his party of seven men only two came out alive. That is why he did not stay there and make locations. Poorly armed Mexicans have had no business there at all, and have known it. When Mexico and Arizona were under the Crown of Spain, its soldiers beat the Apaches back and made prospecting safe. When the great planchas of virgin silver were found, the King decreed that all that kind of mining ground belonged to the Crown. Right there all prospecting stopped, and miners buried and concealed their mines. Just such decrees brought on the Mexican revolution in 1827; but by that time, and since, the Apaches have been supreme lords of the Planchas district, until within the last year or two. Mining is now possible there, and all the old traditions are being verified.—*Arizona Sentinel*.

Churning for Quicksilver.

A couple of Germans are said to be collecting quicksilver from the tailings deposited along the interior rivers, by the use of an iron rod about 10 feet long, the upper end so bent as to form a handle, while to the lower is fixed a piece of copper, 10 pounds in weight and shaped like a soldering iron, in each of the light faces of which are small cavities. In using this instrument the operators sink it into the tailings by a churning motion, which, agitating the quicksilver mixed up with the debris, causes it to flow towards the copper "hoh," entering the holes or adhering to its surface. The "hoh" is withdrawn frequently and the quicksilver and amalgam collected secured, when it is inserted again at another point near by. As there are large quantities of both quicksilver and amalgam lodged in some of these tailings, this method of gathering them may very likely prove profitable.

The Newspaper.

The Press.—Its Power.—A newspaper can drop the same thought into a thousand minds at the same moment. A newspaper is an adviser, who does not require to be sought, but comes to you without distracting your private affairs. Newspapers, therefore, become more necessary in proportion as men become more equal individuals, and more to be feared by tyrants.—*De Toqueville*.

The Press.—Its Use and Abuse.—Of such a powerful instrument of good or evil, we should be all anxious to extend the beneficent and check the baneful influence. If, therefore, you wish to have an honest press, you ought honestly support it.—*Archbishop McHale*.

MECHANICAL PROGRESS.

Bell Metal Alloys.

Edward Kirk in his articles on the foundry notes on bell-metal: One hundred and forty-four pounds copper, 53 pounds tin and 3 pounds iron, is said to make a superior bell. Iron, copper and tin do not unite well, if each is added separately to the other, but if tin-plate scraps are melted in a crucible together with tin, and then this tin and iron alloy added to the molten copper, it will unite readily.

Another alloy that is highly recommended is composed of 53.5 parts copper, 6.11 parts tin, 2.13 parts lead and 3.9 parts tin. This alloy has a good, sonorous sound, even if the mould is not thoroughly dry.

House bells are made of 4 pounds tin to 16 pounds copper.

Soft musical bells are made of 3 pounds tin to 16 pounds copper.

Common bell metal consists of 50 pounds copper to 15 or 20 pounds tin.

The silver bells of Rouen, France, consist of 40 pounds copper, 5 pounds tin, 3 pounds zinc and 2 pounds lead.

Too much tin causes bell metal to be brittle.

The gongs or cymbals and tam-tams of the Chinese are composed of 40 pounds copper to 10 pounds tin. To give these musical instruments their proper tone, they are plunged in cold water while hot, after being cast; cooling in water deprives the metal of almost all its sound. It is tempered and very slowly cooled, which imparts to it that peculiarly powerful sound.

If bell metal is suddenly cooled, it becomes less dense and hard, and is increased in malleability; but the tone of the metal is decidedly impaired, and bells ought never to be cast in damp moulds. When bells are cooled suddenly they should be reheated and tempered by cooling slowly.

ROPE DRIVING GEAR.—The *Textile Manufacturer*, of Manchester, England, says: "We have in these pages frequently called attention to a movement which is now assuming considerable proportions, and which in many districts finds great favor with mill owners and engineers. We allude to the system in which the power is transmitted from the engine to the shaftings by means of ropes. This plan, unlike the one in which the transmission is by means of leather belts, is one of comparatively recent introduction. The fly-wheel is made to serve as driving drum also; it is 22 feet in diameter, and weighs about 20 tons. It is grooved for the reception of 12 hempen ropes, each six inches in girth, six of the ropes being intended to drive one line of shafting, and six the other. The rope drums or pulleys on the shafting are five feet in diameter; the rims are made heavy and are grooved, as is the driving drum, but of course for only six ropes. The width of the grooves is 2.7-16 inches; total depth, 3½ inches; the radius of the bottom curve, one-half inch; and the inclination of the two sides to each other is about 49°. It will be apparent from these particulars that the ropes do not, even when pressed somewhat out of shape when doing full duty, rest upon the bottom of the grooves, but on the sides, and the wear is, therefore, at the points of contact. At the time of our visit, although the engine had been running more than 18 months, the ropes exhibited very striking signs of wear, the wear being tolerably uniform all around the section, thus indicating that the ropes do not, as some might suppose, present the same parts of their circumference to be continuously gripped in the grooves.

RUDDER POWER OF STEAMSHIPS.—A paper lately read before the British Institute of Naval Architects described an easy and effective method of ascertaining the rudder-power of steamships. Steamships, after being equipped, are usually subjected to certain trials to ascertain the diameter of the smallest circle in which they will turn round with the rudder in any given position; but this system of experiment is open to several objections. To obviate these the writer proposed a new plan, viz., pulling a boat into and retaining it in the wake of the ship, and from the boat observing with a sextant the angle subtended at the eye by two extreme masts of the vessel. The angle so obtained was constant, and afforded sufficient time for making the observations with accuracy. This observation having been made, at a preconcerted signal, the angle of the rudder may be changed, and a fresh observation made from the boat, which may be repeated as often as necessary. The diameters of the different circles can then be easily calculated from the data at hand.

COMPRESSED AIR AS A MOTOR FOR STREET CARS.—The Second Avenue Railroad Company in New York, says the *Railroad Gazette*, has been for some time experimenting with a car driven by compressed air, the machinery being the invention of Messrs. Hardy and James, two Scotch engineers. The results are said to have been so encouraging that the company is about to have several more cars built on the same plan. The machinery is said to be very simple, to occupy but little room, and to cause none of the heat and smell which is objected to when a steam engine is used. It also weighs much less than a steam engine and boiler of the same power.

DRIVING TUBE WELLS AT THE BOTTOM.—In the usual method of sinking tube wells much of the power available for forcing down the tube is lost through the great distance from the point at which the blow is necessarily given, but a very ingenious remedy has been provided by Messrs. Le Grand and Sutcliffe, of Bunhill-row, England. In constructing tube wells, according to their invention, says the *Mining Journal*, instead of sinking the tube at or above the surface by means of a monkey or weight falling upon the top of the tube or upon a clamp, the blow is given immediately above the point at its lower extremity by means of an elongated weight small enough to pass down the inside of the tube to be driven. This weight is raised and allowed to drop inside the tube by means of a rope, chain, rods, or other appliances, either lifted direct, or by pulleys attached to the tube itself, or by other suitable means. The weight, by preference, is shod with steel. In some cases they make the first tube about three feet long, with a clew bore slightly smaller in internal diameter than those to follow it; the driving weight is in this case packed with a leather cup or other sufficient packing to allow it to pass loosely down the tubes until it comes to the small or bottom pipe, where it fits more closely, so that when raised it produces a partial vacuum, which not only obviates any compression of air that might take place during the fall of the weight, and so partially impede the force of the impact, but, on the contrary, accelerates the fall and increases the effect of the blow. Instead of striking the blow at the bottom of the tube, a stout collar or ring, to form a ledge inside the tube, may be placed at the first joint—say two or three feet from the bottom of the tube—upon which a cylindrical block of iron or steel can be laid to receive the blow of the monkey or driving weight. This block is provided with a keyhole, so that it can be fished up and lowered by a key attached to a rod.

SAND AS FOUNDATION MATERIAL.—One of the best possible foundations is sea sand; at least so long as it is not interfered with. The man who built his house upon the sand was not quite the lunatic that many worthy people suppose. Under ordinary circumstances, his abode was just about as secure as his neighbor's upon the rock. Unfortunately, however, one stormy night an unexpected flood came, and next morning his want of forethought was made apparent. So long, therefore, as sand is uninfused by running water it is safe. Sink, however, a well near, and you at once undermine its security. Nothing is more treacherous than sand when allied with water. In harbor works heavy piles (driven many feet into the sand) lifted and thrown up high and dry on the adjoining beach by a single night's gale. Sand has many curious properties. Its incompressibility is well known. A paper cylinder filled with sand will sustain a surprising load. One of the Loudon Polytechnic experiments, a few years ago, was to bury an egg in sand within a sort of enlarged cupel mold, and then to pound the die vigorously; on afterwards emptying the sand, the egg was found uninjured. The ancient Egyptian engineers, it is surmised, must have used sand extensively for some purposes for which we employ timber. Mr. Dixon supposes Cleopatra's Needle, and the various monoliths of similar character, to have been raised into a vertical position by means of hillocks of sand.

TALC AS AN ANTI-INCURSTATOR.—Recent experiments made in France by Mr. Michand and Mr. Lory, of the Grenoble departmental laboratory on the use of finely pulverized talc as an anti-incrustator, have been confirmed by practical test and favorably reported on by Mr. Marie. Talc was tried by him in locomotive and stationary boilers at Rhone and Mont Cenis where the water used makes a very considerable deposit. Mr. Marie reports that new boilers or such which had been cleaned were preserved from scale during the entire time when acted upon by the talc, but as soon as its use was discontinued a scale was produced at the end of less than one month. The talc acts entirely mechanically, presenting by its foliated structure a large surface for the deposit of the salts, and sliding down the sides of the boiler with greater facility than the clay sometimes used for the same purpose.

LONDON UNDERGROUND RAILWAYS.—Some interesting facts concerning the operations of the Metropolitan Underground Railway of London are contained in the half-yearly report of the company, recently issued. The length of the main line is 8 miles and 10 chains, and of lines partly owned by the company 2 miles and 40 chains. The number of passengers conveyed in 1877 was 56,175,753, about one-third the number annually conveyed over the 120 miles of horse car roads in New York. The receipts of the half year aggregated £224,949 7s. 10d., or at the rate of £2,249,490 for the year.

LONG RUN TO A CORD OF WOOD.—The locomotive *Santa Fe*, on the Atlantic, Gulf & West India Transit Company's road, we are informed, on one day in March made the run from Fernandina, Fla., to Cedar Keys, 155 miles, with the mail train of three cars, using only three-quarters of a cord of wood, or at the rate of 206½ miles to the cord. The schedule time of the train is 9½ hours, and the usual consumption of wood by other engines is 2½ cords for the run. The engine is of the ordinary eight-wheel pattern, with 14x22 cylinders, and four 5-foot drivers.

SCIENTIFIC PROGRESS.

Professor Garrod on Protoplasm.

Prof. Garrod, in the second of his course of lectures at the English Royal Institution on the protoplasmic theory of life, said that he believed the original idea of a cell as first taught by Schleiden and Schwann is incorrect. The use of the reagents they employed, to get clearness as they supposed, really brought about artificially those changes which led them to believe that a cell consisted of a cell-wall, cell-contents, nucleus and nucleolus. Prof. Garrod would define as a cell a separate mass of protoplasm, whether surrounded by formed material or not. This formed material comes from the precipitation of salts of lime by the protoplasm and from the formation of hyaline, etc. In this way the tissues of the body are built up. In the growth of the epidermis the cells are gradually more and more filled with precipitated matter, the protoplasm occupies less and less space, and finally the cells die and are removed from the surface. In fatty tissue the hydrocarbons of the food are gradually precipitated in the cells till the protoplasm becomes only an investing membrane. The muscular tissue is material formed by protoplasm, but is not itself alive. Allusion was made to the statement of the striation of muscles mentioned in most text-books. Mr. Schafer's microscopic observations on the leg of the water-beetle suggest that this is a deceptive optical effect rather than a reality. In speaking of the elastic tissues precipitated from protoplasm, the ligament which supports the head of quadrupeds was specially referred to; and Prof. Garrod said he thought that many who had written about bearing-reins did not know that this ligament, when strong and healthy, holds up the head of the animal without effort, and that it is an effort for the animal to get its head down to feed or drink. Some young animals keep this ligament on the stretch too much—a bad habit which the hearing-rein tends to correct. After speaking of nerve tissues being evolved like all the other tissues from protoplasm, Prof. Garrod referred to the foods that have to be taken to supply this protoplasm. As is well-known, writers on foods group them into organic and inorganic, with the organic again subdivided into nitrogenous and non-nitrogenous. The nitrogenous foods, it is now believed, contrary to Liebig's first teachings, are those used in repairing the "machinery" of the body, while the non-nitrogenous furnish the source of power for action—play the part of fuel, as it is often popularly put. In a letter lecture of the series Prof. Garrod spoke of the red color of arterial blood in contrast to the blue color of venous blood, and showed an experiment with spectra in illustration of this. The spectrum of diluted red blood was first shown, and then to the solution of a deoxidizing agent was gradually added, when the spectrum of blue blood appeared. The difference of color is due to the oxidized condition of red blood and the deoxidized condition of the blue. In both cases the serum is of the same straw tint, and it is the color of the protoplasmic corpuscles which is changed. The oxy hæmoglobin which colors them in the arterial blood is deoxidized into hæmoglobin as they circulate through the body. It is believed that the oxygen of the oxy hæmoglobin is but very slightly attached. Some experiments were shown with the Sphygmograph to illustrate that the character of the pulse is dependent, not only on the heats of the heart, but also the pressure on the heart, and the connected blood vessels being increased and relaxed by each inspiration. In speaking of the heat of the body, Prof. Garrod said it was to be recollected that not only muscular action, but the "vitality" of protoplasm all through the body—very analogous to combustion—gave a regular supply of heat.

MINING AND METALLURGY.—In his report to the Assembly Committee on Education, Prof. Becker, of the State University, made the following allusion to the needs of his department: Mining engineering is probably the most complex of all professional studies; involving many branches regarded as the substance of separate professions. Not only must the mining engineer be a civil engineer, a mechanical engineer and an hydraulic engineer; but he must be a geologist, a mineralogist, and, above all, a chemist as well. Instruction in mining and metallurgy of the University of California has, however, thus far been given only by a single instructor, who is compelled to deliver six separate courses, averaging forty-two lectures each, besides laboratory instruction in assaying, and yet fails in the endeavor to cover more than the most indispensable portions of the science; many important topics, such as electric-metallurgy, casting, and others being omitted for want of time. In well organized schools of mining the whole time of at least four instructors is considered indispensable to sufficient instruction in the same topics; those, namely, which bear directly upon the practice of the profession. No pretence, therefore, can possibly be made, that the subjects are exhaustively treated; all that can be attempted is to infuse the spirit of modern mining science, and to place the students in a position to supplement by their own studies the imperfect instruction they receive. This effort, it is believed, has been measurably successful.

Evolution and Materialism.

We of to-day hear so much about evolution and materialism that it is well for us to fully understand their meanings. To many they are one and the same thing. But Prof. Le Conte, of the University of California, in the current number of the *Popular Science Monthly*, very clearly shows the distinction between the two. He says: "First of all I wish frankly to acknowledge that I am myself an evolutionist. I may not agree with most that evolution advances always *cum aqua pite*. On the contrary, I believe that there have been periods of slow and periods of rapid, almost paroxysmal, evolution. I may not agree with most that we already have in *Darwinism* the final form and *survival of the fittest*, the prime factor of evolution. On the contrary, I believe that the most important factors of evolution are still unknown—that there are more and greater factors in evolution than are dreamed of in the Darwinian philosophy. Nevertheless, evolution is a grand fact, involving alike every department of nature; and more especially evolution of the organic kingdom, and the origin of species by derivation, must be regarded as an established truth of science." This paragraph on evolution was quoted in our notice of Prof. Le Conte in last week's PRESS. We wish now to publish it in connection with his definition of materialism, that the contrast may clearly appear. He says: "But, remember, evolution is one thing, and materialism another and quite a different thing. The one is a sure result of science; the other a doubtful inference of philosophy. Let no one who is led step by step through the paths of evolution, from the mineral to the organic, from the organic to the animate, and from the animate to the rational, until he lands logically, as he supposes, into blank and universal materialism—let no such one, I say, imagine for a moment that he has been walking all the way in the domain of science. He has stepped across the boundary of science into the domain of philosophy. Yet the step seems so easy, so natural so inevitable, that most do not distinguish between the teachings of science and the inference of philosophy, and thus the whole is unjustly accredited to science."

Asbestos Felt for Filters.

Mr. F. A. Gooch, of Cambridge, in a paper recently presented to the American Academy, describes a method he has devised of preparing a felt of anhydrous asbestos, which, says the *Journal of Chemistry*, is capable of filtering liquids rapidly and efficiently; is light, compact, and incombustible at the highest temperatures used in analysis; is not acted upon by acids (except hydrofluoric) or alkalis; is not disintegrated by forcing a liquid through it with the Bunsen pump; and is very easily prepared. By its use more accurate results can be reached in many analytical processes than in any other way. The felt is prepared by scraping white silky asbestos to a fine, short down, boiling it with hydrochloric acid, and washing it by decantation. It is then deposited by the aid of the Bunsen pump on the bottom of a platinum crucible perforated with fine holes; or, better, the bottom may be made of fine platinum gauze. The process, which is described and illustrated in the "Proceedings" of the Academy, is simple and quick, occupying less time than is required for folding and fitting an ordinary paper filter to a funnel. Various modifications of the method suited to special cases are also described. These filters are found especially useful in the treatment (1) of precipitates which must be dried at low temperatures, being liable to spontaneous decomposition at higher ones, (2) those which have had to be separated from the filter before ignition to avoid reduction by heating in contact with carbon, and (3) those which may be ignited in contact with carbon, but which make its complete combustion difficult. We commend the method to the attention of chemists.

THE POPULAR SCIENCE MONTHLY.—The progress, which has been made of late years in the dissemination of scientific truth among the people, can be clearly seen in the wide circulation which has been secured by scientific publications. Take, for example, the uprising of the *Popular Science Monthly*, of which D. Appleton & Co., of New York, are publishers, and Prof. Youmans, editor. The life of this periodical marks an era in the popular science progress of this country. It sprang at once into wide circulation, because of the popular demand that the researches of leading investigators should be no longer locked in the folios of technical, and, to many, unintelligible volumes. It has grown vastly since its beginning, because it has itself fostered and promoted the demand for popularized science. Thousands have been attracted from the following of the shallow and the sensational to the pursuit of truth, because facts have been shown to be, in many cases, far more valuable and intrinsically interesting than fancies. In this feature of its work the *Popular Science Monthly* has done a work and exerted an influence which brings honor to the name. We have already in a previous issue alluded to the demand for "more light," which forced Messrs. Appleton to begin the publication of the *Popular Science Supplement*. This venture has proved almost as valuable to the public as the original magazine, and we trust may be remunerative to the publishers.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Apr. 25.	Week Ending May 2.	Week Ending May 9.	Week Ending May 16.
Alpha.	9 74	84 74	74 84	8 74
Alfa.	30c	25c	25c	45c
Andes.	14	24	12	14
Alps.	14	24	12	14
Argenta.	25c	15c	20c	20c
Baltimore Con.	35c	50c	50c	35c
Belcher.	70c	55c	45c	30c
Belmont.	17	14c	15c	12c
Best & Belcher.	17	14c	15c	12c
Bullion.	4.50	3.80	4	3.30
Bechtel.	3.20	1.70	24	2.10
Bodie.	2.10	2	1.1	1.15
Benton.	2.10	2	1.1	1.15
California.	2.60	2.10	1.1	1.15
Challenger.	27c	26c	26c	25c
Chollar-Potosi.	25c	24c	24c	25c
Confidence.	4	3c	3c	3c
Con Imperial.	55c	40c	50c	50c
Con Virginia.	16c	15c	13c	14c
Crown Point.	10c	5c	3c	3c
Day.	25c	15c	20c	15c
DeFrees.	25c	15c	20c	15c
Eureka Con.	54c	49c	53c	50c
Excelsior.	2.60	2.10	2.1	2.0
Flint.	65	60	1	70c
Gen Thomas.	54	4	3c	3c
Grand Prize.	54	4	3c	3c
Gila.	85c	70c	80c	75c
Golden Chariot.	40c	30c	30c	35c
Gould & Curry.	84	6	5c	5c
Hale & Norcross.	10	7c	8c	6c
Hussey.	55c	40c	40c	40c
Julia.	3.20	2.40	2.45	1.40
Justice.	3.20	2.40	2.45	1.40
Jackson.	3.20	2.40	2.45	1.40
Joe Seate.	3.20	2.40	2.45	1.40
K K Con.	3	2.80	3	2.80
Kentuck.	3	2.80	3	2.80
Kosuth.	4	3c	3c	3c
Lady Wash.	4	3c	3c	3c
Leopard.	20c	50c	30c	45c
Leviathan.	20c	50c	30c	45c
Leeds.	10c	15c	15c	15c
Madison.	10c	15c	15c	15c
Manhattan.	10c	15c	15c	15c
Meadow Valley.	10c	15c	15c	15c
Mexican.	10c	15c	15c	15c
North Con Virginia.	75c	75c	50c	60c
Northern Belle.	6c	5c	5c	5c
New Cose.	1.15	90c	1.15	1.15
Nevada.	90c	50c	60c	50c
Ophir.	25c	27c	27c	25c
Overman.	13c	10c	9c	9c
Panther.	25c	25c	25c	25c
Raymond & Ely.	3c	3c	3c	3c
Rock Island.	14c	12c	11c	9c
Sage.	14c	12c	11c	9c
Best Belcher.	4	3.95	4.15	3.85
Sierra Nevada.	1.10	90c	1.10	90c
Silver Hill.	1.10	90c	1.10	90c
Succor.	50c	10c	20c	35c
Solid Silver.	2c	2.55	2.20	2.35
Star.	1c	50c	1.50	1.30
Trojan.	40c	30c	40c	30c
Union Con.	40c	30c	40c	30c
Utah.	10c	8c	7c	8c
Wells-Fargo.	50c	10c	50c	15c
Woodville.	35c	45c	35c	25c
Yellow Jacket.	7c	6c	5c	5c

Sales at S. F. Stock Exchange.

Friday A. M. May 10.	250 Benton.	11
380 Alta.	700 Bullion.	25c
110 Alpha.	380 B. chell.	2.40
300 Andes.	40c Bullion.	1.15
150 Bullion.	3.65c Bullion.	1.15
250 Best & Belcher.	13	50c
305 Belcher.	2.40	2.20
275 Benton.	1.15	1.15
400 Boyle.	1.15	1.15
1235 California.	2.25	2.25
670 Con Virginia.	1.15	1.15
140 Crown Point.	3.10	1.10
2170 Con Imperial.	3.10	1.10
70 Confidence.	680	680
330 Caledonia.	1.60	1.60
125 Chollar.	25c	25c
500 Con Washoe.	50c	50c
20 Excelsior.	2.20	2.20
635 Gould & Curry.	85c	85c
635 Hale & Nor.	6c	6c
330 Justice.	4.00	4.00
3655 Julia.	4.15	4.15
10 Kentuck.	8c	8c
400 Mexican.	6c	6c
400 New York.	6c	6c
915 Ophir.	25c	25c
60 Overman.	15c	15c
185 Rough & Ready.	15c	15c
980 Savage.	3c	3c
305 Sierra Nevada.	3c	3c
470 Silver Hill.	1.10	1.10
400 Succor.	10c	10c
1750 Trojan.	30c	30c
135 Union Con.	33c	33c
160 Ward.	1.05	1.05
500 Ward.	1.05	1.05
170 Yellow Jacket.	20c	20c
AFTERNOON SESSION.		
465 Alta.	7c	7c
10 Alpha.	7c	7c
450 Belmont.	35c	35c
1000 Belle Isle.	20c	20c
20 Bodie.	1.30	1.30
200 Bullion.	3.70	3.70
510 Belcher.	3.40	3.40
300 Combination.	2.00	2.00
1500 Con Imperial.	4.00	4.00
305 Con Virginia.	13c	13c
540 California.	25c	25c
800 Crown Point.	3.60	3.60
60 Chollar.	30c	30c
95 Day.	30c	30c
320 DeFrees.	10c	10c
875 Endowment.	90c	90c
750 Excelsior.	2.15	2.15
340 Grand Prize.	3.30	3.30
600 Gila.	75c	75c
340 Gould & Curry.	84	84
700 Hussey.	40c	40c
490 Hale & Nor.	6c	6c
500 Hillside.	6c	6c
1500 Homestake.	6c	6c
300 Independent.	90c	90c
320 Jackson.	4.35	4.35
610 Julia.	4.45	4.45
500 Justice.	4.45	4.45
100 Leopard.	4.50	4.50
20 Leeds.	1.30	1.30
1250 Modoc.	3.15	3.15
620 Manhattan.	3.15	3.15
55 Mexican.	8c	8c
80 Northern Belle.	6c	6c
550 Newark.	1.10	1.10
2100 Nevada.	25c	25c
200 New Cose.	30c	30c
380 Ophir.	25c	25c
45 Overman.	15c	15c
45 Phenix.	15c	15c
200 Silver Price.	1.30	1.30
720 Silver Hill.	1.30	1.30
50 Star.	1.10	1.10
330 Sierra Nevada.	3.20	3.20
100 Silver Price.	1.10	1.10
155 Tip-top.	30c	30c
5 Utah.	7c	7c
250 Ward.	1.10	1.10
255 Yellow Jacket.	5c	5c
Saturday A. M. May 11.		
300 Alpha.	40c	40c
425 Alta.	6c	6c
500 Argenta.	10c	10c
430 Bullion.	3.40	3.40
180 Best & Belcher.	1.15	1.15
620 Belcher.	3.62	3.62

870 California.	2.25	2.25
565 Caledonia.	1.55	1.55
350 Crown Point.	3.50	3.50
160 Chollar.	2.25	2.25
320 DeFrees.	10c	10c
750 Day.	30c	30c
40 Eureka Con.	54c	54c
550 Endowment.	90c	90c
810 Grand Prize.	3.05	3.05
220 Gould & Curry.	4.70	4.70
100 Homestake.	6c	6c
120 H & Norcross.	6c	6c
150 Independent.	90c	90c
430 Justice.	4.45	4.45
430 Kentuck.	8c	8c
100 Jackson.	3c	3c
200 Leopard.	40c	40c
120 Modoc.	2.95	2.95
120 Manhattan.	3.15	3.15
130 Mexican.	8c	8c
50 Nevada.	30c	30c
100 New Cose.	30c	30c
300 Newark.	15c	15c
100 Silver Hill.	1.30	1.30
120 Overman.	15c	15c
200 Panther.	15c	15c
25 Phenix.	15c	15c
420 Raymond & Ely.	2.40	2.40
300 Rough & Ready.	15c	15c
100 Star.	1.10	1.10
400 Savage.	1.10	1.10
120 Sierra Nevada.	2.85	2.85
200 Tip-top.	1.15	1.15
130 Union Con.	1.15	1.15
300 Union Con.	3.05	3.05
1000 Ward.	1.10	1.10
250 Yellow Jacket.	5c	5c
Sunday A. M. May 12.		
1000 Alpha.	40c	40c
300 Andes.	10c	10c
1385 Best & Belcher.	1.10	1.10
300 Bodie.	1.10	1.10
635 Benton.	1.10	1.10
300 Belcher.	2.30	2.30
100 Boyle.	1.10	1.10
3655 Con Imperial.	50c	50c
1370 Con Virginia.	1.10	1.10
1380 California.	2.25	2.25
530 Caledonia.	1.15	1.15
1200 Chollar.	2.25	2.25
570 Excelsior.	2.65	2.65
1555 Gould & Curry.	4.45	4.45
915 Hale & Nor.	4.45	4.45
530 Justice.	4.45	4.45
135 Kentuck.	8c	8c
450 Mexican.	6c	6c
200 New York.	6c	6c
180 Overman.	15c	15c
200 Rough & Ready.	15c	15c
565 Sierra Nevada.	2.90	2.90
1210 Savage.	1.10	1.10
500 Silver Hill.	1.20	1.20
500 Combination.	2.00	2.00
500 Solid Silver.	2.40	2.40
825 Trojan.	30c	30c
475 Union Con.	3.15	3.15
170 Utah.	7c	7c
250 Ward.	1.10	1.10
245 Yellow Jacket.	5c	5c
AFTERNOON SESSION.		
585 Alta.	7c	7c
1375 Argenta.	10c	10c
135 Bullion.	3.40	3.40
655 H & B.	10c	10c
200 Belmont.	30c	30c
40 Bullion.	3.20	3.20
270 Belcher.	3.20	3.20
1040 Con Virginia.	1.10	1.10
1300 California.	2.25	2.25
250 Con Imperial.	5c	5c
250 Caledonia.	1.15	1.15
400 Crown Point.	3.05	3.05
100 Chollar.	2.25	2.25
600 DeFrees.	10c	10c
850 Day.	30c	30c
100 Endowment.	90c	90c
200 Grand Prize.	3.15	3.15
200 Golden Chariot.	40c	40c
405 Gould & Curry.	4.45	4.45
775 Gila.	75c	75c
1000 Homestake.	6c	6c
50 Hussey.	40c	40c
430 Hale & Nor.	6c	6c
250 Hamburg.	30c	30c

SALES OF LAST WEEK AND THIS COMPARED.

Thursday A. M. May 9.	Thursday A. M. May 16.
80 Alpha.	140 Alpha.
1045 Alta.	20 Andes.
175 Andes.	485 Best & Belcher.
250 Bullion.	300 Bullion.
235 Best & Belcher.	100 Belcher.
120 Bodie.	100 Bodie.
325 Benton.	100 Benton.
185 Belcher.	100 Belcher.
3225 Con Imperial.	440 Caledonia.
1470 California.	500 Challenge.
325 Con Virginia.	35 Chollar.
180 Chollar.	450 Con Virginia.
50 Crown Point.	220 Crown Point.
195 Caledonia.	570 Con Imperial.
420 Excelsior.	420 Excelsior.
220 Gould & Curry.	340 Gould & Curry.
240 Hale & Nor.	20 Grand Prize.
3340 Julia.	720 Hale & Nor.
155 Justice.	880 Justice.
300 Kentuck.	300 Kentuck.
150 Mexican.	245 Mexican.
580 Ophir.	190 New York.
415 Overman.	300 Northern Belle.
100 Rough & Ready.	220 Silver Hill.
1000 Sierra Nevada.	300 Savage.
1100 Sierra Nevada.	520 Silver Hill.
935 Savage.	325 Sierra Nevada.
1200 Silver Hill.	500 Union Con.
200 Trojan.	500 Union Con.
50 Utah.	520 Utah.
500 Union Con.	1015 Ward.
880 Ward.	335 Yellow Jacket.
370 Yellow Jacket.	
AFTERNOON SESSION.	
350 Alta.	110 Alta.
30 Alps.	150 Alps.
500 Argenta.	150 Argenta.
400 Belmont.	100 Belmont.
350 Bodie.	100 Bodie.
75 Bechtel.	24 Bechtel.
300 Belle Isle.	100 Belle Isle.
185 California.	120 Bullion.
230 Con Virginia.	500 Con Virginia.
550 Crown Point.	515 Con Virginia.
1140 Con Imperial.	350 Chollar.
80 Chollar.	295 California.
75 Day.	100 Day.
120 DeFrees.	250 DeFrees.
135 Eureka Con.	105 Eureka Con.
900 Endowment.	45 Excelsior.
450 Grand Prize.	490 Endowment.
500 Hale & Nor.	450 Grand Prize.
150 Hillside.	1205 Gila.
300 Homestake.	5105 Gould & Curry.
950 Independent.	500 Hamburg.
2345 Julia.	155 Hale & Nor.
50 Justice.	100 Independent.
330 Jackson.	375 Julia.
1200 Leopard.	500 Leopard.
300 Modoc.	100 Leeds.
335 Manhattan.	230 Modoc.
100 New Cose.	100 Northern Belle.
600 Newark.	100 Newark.
700 Nevada.	100 Nevada.
290 Ophir.	100 Ophir.
100 Panther.	150 Panther.
270 Sierra Nevada.	300 Ophir.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S Co	Washoe	11	100	May 10	June 14	July 2	Wm H Watson	302 Montgomery
Alta S M Co	Washoe	10	25	Apr 11	May 7	May 23	M Sanders	303 Montgomery
Baltimore Con M Co	Washoe	19	50	Apr 13	June 3	June 21	O A Sankley	331 Montgomery
Bechtel G M Co	California	1	30	Apr 23	June 3	July 1	W H Lent	309 Montgomery
Belcher S M Co	Washoe	14	100	May 14	June 18	July 8	Jno Crockett	419 California
Best & Belcher M Co	Washoe	12	100	Apr 16	May 21	June 10	Wm Jno	309 Montgomery
Belmont M Co	Nevada	17	25	May 6	June 7	July 2	J W Pew	310 Pine
Confidence S M Co	Washoe	11	50	Apr 10	May 15	June 5	R Wegener	414 California
Consolidated Imperial M Co	Washoe	6	20	Apr 9	May 15	June 5	W B Dean	419 California
Dayton G & S M Co	Washoe	10	25	Apr 2	May 7	May 28	W B Dean	419 California
DeFrees M & M Co	Nevada	6	15	Apr 24	May 17	June 17	T E Atkinson	310 Pine
El Dorado South M Co	Nevada	12	50	Apr 27	May 31	June 25	C A Sankley	331 Montgomery
Falcon M Co	Nevada	3	10	Apr 30	June 3	June 24	R H Brown	327 Pine
Gould & Curry S M Co	Washoe	31	100	Apr 16	May 22	June 12	A K Durhuoy	309 Montgomery
Gila Co	Nevada	1	5	Apr 2	May 1	June 10	W J Peterson	419 California
Hale & Norcross S M Co	Washoe	58	50	May 14	June 15	July 10	Joel F Lightner	309 Montgomery
Hamburg M Co	Nevada	1	50	Apr 20	May 21	June 18	David A Jennings	401 California
Homestake M Co	Dakota	2	100	Apr 8	May 10	June 5	D F Verdenal	327 Pine
Justice M Co	Washoe	24	100	Mar 23	May 4	May 25	R E Kelley	419 California
Leona M Co	Washoe	33	50	Mar 20	Apr 23	May 18	A F Main	414 California
Mexican G & S M Co	Washoe	5	50	May 15	June 21	July 10	J C McCoy	419 California
Minnetta Bell S M Co	California	2	25	Apr 3	May 6	May 27	Jno T McGehegan	Merchant's B
Newark G & S M Co	Nev	14	50	Mar 10	Apr 22	May 20	W H Allen	419 California
North Con M Co	Cal	8	50	Mar 20	Apr 23	May 18	D F Verdenal	327 Pine
North Con Virginia M Co	Washoe	12	50	Apr 15	May 18	June 6	A F Main	309 California
Ophir S M Co	Washoe	31	100	Mar 26	Apr 30	May 20	G L McCoy	419 California
Overman S M Co	Washoe	41	300	Apr 26	May 31	June 20	C D Edwards	414 California
Raymond & Ely M Co	Nevada	7	100	Apr 15	May 20	June 17	J W Pew	310 Pine
Sierra Nevada S M Co	Cal	33	50	Mar 20	Apr 23	May 18	D F Verdenal	309 Montgomery
Silver Hill M Co	Washoe	2	100	Apr 5	May 10	June 1	W E Dean	419 California
Sierra Nevada S M Co	Washoe	54	50	May 14	June 19	July 8	W W Stetson	309 Montgomery
Union Con S M Co	Washoe	11	25	Apr 10	May 14	May 31	J M Bufington	309 California
Wells Fargo M Co	Washoe	9	10	Mar 30	May 3	May 22	W M Helman	309 California
Yellow Jacket S M Co	Washoe	29	200	Apr 5	May 8	May 7	P K Smith	Gold Hill

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

DOUBLE STANDARD.—*Chronicle*, May 4: The mill continues steadily at work, and the work of the concentrators are satisfactory to Superintendent Coleman. The sulphurets will be shipped to San Francisco as soon as sacks are procured.

THE ADVANCE.—Running in a good ore body continues in the north drift. Other portions of the mine look well.

CALAVERAS.

GRAVEL MINES.—*Chronicle*, May 11: The season from the first rainfall has been unexceptionally favorable. Water is abundant and promises to hold out till late in the summer, and the mines generally are looking and yielding well. The Rough Diamond claim is worked through a tunnel. The gravel is so hard that it is to be crushed before being put into the sluices. It is a great success and employs many men in the mine and mill. Brown & McSorley have also developed a fine body of gravel. McCann's claim, though not extensive, is paying well, also the Veith, which is opened on a large scale. Mason & Co. own a first class property which gives employment to a large number of hands, and is coining money for the owners. The claim of Moser & Co. is fitted up with the best of modern appliances, is well managed, and best of all is making the fortunes of its owners. The old Deepwound ground has been put in good shape and will be ready for operations in a few days. Emerson has one of the best appointed claims in the mountains, uses about 1,000 inches of water, and will make a big clean up shortly. At Buckeye, Cook, Smith & Co., proprietors of the Gopher hydraulic, are working steadily and are doing well. The Calaveras hydraulic, the property of Cook, Raynor & Cook, is being steadily worked with satisfactory results. On the lower Stockton road, near the French Hospital, Mr. W. W. Cook is operating an extensive hydraulic. At the Duryea mine, in Chile gulch, everything is progressing favorably. Work is being crowded ahead as rapidly as possible, and a large amount of gravel is washed daily. The battery is kept in ceaseless motion, the mill and mine affording employment for from 25 to 30 men. The yield of the mine is satisfactory, and its prospects excellent.

EL DORADO.

THE BOULDER CLAIM.—*Mountain Democrat*, May 11: Work on this claim at Pilot Hill, the property of the California Water Co., is progressing finely. The run will terminate about the first of July, when a big clean-up is anticipated. A few nights ago, the watchman saw a Chinaman creeping into the sluices, and blazed away with a charge of huck shot. Two or three days afterwards, a Chinaman with a badly mangled hand and perforated trousers was seen lurking about. He is supposed to have been the recipient of the watchman's leaden bounty.

NEW MINING ENTERPRISE.—Mr. Chapman, who represents a large amount of Eastern capital, was in Placerville last Tuesday, for the purpose of recording the patent to a large river and bank claim at Brown's Bar, on the Middle Fork of the American, a short distance above Murderer's Bar. The claim is to be worked by a pumping machine which will rapidly raise sand, gravel, and even boulders of two feet to thirty inches in diameter. The machinery is to be rigged on a boat, constructed of immensely heavy timbers, the boat is to be 30 feet wide and 30 feet long. A similar enterprise was unsuccessfully tried at Oroville, but Mr. Chapman was a witness of that attempt, studied it closely, and is sanguine that he perceived and has overcome its defects. In that case the boat was too long and not wide enough, causing a tendency to "hog." The machine proper was a success, doing its work perfectly; but the engine used—a ten-horse power—was totally inadequate to the work required. Mr. Chapman has supplied himself with an engine of forty-horse power, with a boiler of fifty-horse power. His pumping cylinder will be three feet in diameter, and will lift and deposit into a dump at the head of the sluice boxes a charge of about five tons every three minutes. Mr. Chapman estimates that he can lift and wash gravel with his apparatus at a cost not exceeding four cents per ton. He expects to have it in operation within 30 days. If it proves a success—of which we entertain no shadow of a doubt—it will work an immense wealth-producing revolution in river mining.

NYO.

SWANSEA.—*Independent*, May 4: The furnaces here are undergoing complete repairs preparatory to business. The Ygnacio company have agreed to put 10 men at work getting out rich silver ore for the new works, for which liberal prices are paid per ton.

LAKE DISTRICT.—This locality possesses many advantages as regards water, timber, grass, etc. The mountain in which the mines occur is very lofty, runs nearly north and south, and carries gold and silver in croppings and float for a distance of four and a half miles. About four miles to the southeast of this main belt are numerous base metal ledges, well defined, and of an average width of four and a half feet. Some of these assay from \$40 to \$180 per ton in silver, with a trace of gold. The number of mining locations to date is supposed to be about 300, besides timber claims, hyacinth ranches and mill sites. The town at the mines is known as Lako City, so called from the five small lakes adjacent thereto. Lots are taken up and fenced for a distance of about one mile, and some 20 or more houses are in course of erection. The town at the foot of the mountain about two miles west of the mines is known as Mineral Park, which, though not so extensively located as yet, has the appearance of a more permanent business place, as it will be as far as teams can get for three or four months to come. The number of inhabitants is estimated at 125.

NEVADA.

KEEPING IT UP.—*Transcript*, May 13: The usual monthly dividend of \$7.50 per share, amounting to \$23,350 has been declared by the Idaho mining company, of Grass Valley, payable immediately. The bullion product for April was \$58,000, all gold.

THE RELIEF HILL MINES.—Owing to the high price of water and the unusually large amount of pipe-clay which has been encountered of late at the Relief Hill mines, hydraulicing has been rendered impracticable, and drifting has been substituted, with most favorable results. The various mines are in full operation, and a large amount of gold is being taken out.

PROGRESS IN THE WATT MINE.—Sinking has been stopped in the Watt Blue Gravel mine, and drifting commenced. The drift is in over 30 feet from the shaft, with the bed-rock pitching almost due east. Another week's drifting will enable the projectors to form a better idea of the situation. The water has slackened off considerably, and the machinery is working well.

YOU BET.—Both the English and Hussey hydraulic companies have lately made satisfactory clean-ups. The Nevada company are rushing things ahead lively, and in a few days will have another claim under full headway.

PLACER.

DAMASCUS AND VICINITY.—*Argus*, May 4: The Mountain Chief, a comparatively new mine, situated near the Sugar Pine mill, is being actively and intelligently developed by a company of practical men. An incline shaft, 175 feet in length, has already been sunk. The claim promises very well, as every indication goes to show that the men now working are over the ancient blue lead channel, which all drift miners up here hope to strike. The Michigan Bluff Enterprise company, whose claim is about a mile north of the Sugar Pine mill, will shortly resume operations. The West Damascus mine will also be in operation soon. It is situated between Damascus and Iowa Hill. The Golden Fleece, another new company, controlled by San Francisco capitalists, is situated at the Hog's Back, seven miles above the Fork house. They are setting their men to work now. About ten new companies have lately been formed to work claims in the vicinity of the Hog's Back. The Mountain Gate mine is being profitably worked in cement. The men at the Lewis claim are drifting at present. They are understood to be doing well. At Canada hill, A. G. Reed had some of his iron pipe destroyed by the snow crushing it flat. About 20 feet of snow lay upon it in places, and being empty, the pipe had to succumb. Previous to the late storm there was an average of eight feet of snow here. Part of the mine has been leased to Mr. Shipman, of Forest Hill, who is working Chinamen. Part of the tunnel caved in lately, owing to its nearness to the surface and the soaking through of water from above. The American hill and Walter Palmelee's claims are reported as doing well.

THE BREECE AND WHEELER claim at Bath is doing well. The owners have already cleaned up twice and will have one or two more runs. Water is yet quite plenty, some 1,300 inches now running over their dam to waste. They are likely to run until late in June and probably to the first of July. The Van Emon claim, at Michigan Bluff, is also doing very well. Indeed all the hydraulic claims on the Divide are getting in a long and profitable season's work.

SIERRA.

WATER.—*Mountain Messenger*, May 11: The Bald Mountain company struck a heavy flow of water in their mine a few days ago. The water broke through the pipe-clay in gangway 77, and ran about 60 inches for a time, but finally subsided to about 40 inches and remained at that at last accounts. Several breasts were caved, and the workmen were obliged to leave the mine for a time. If the volume of water will continue through the dry season it will prove of great value.

TRINITY.

WEAVERVILLE D. & H. M. Co.—*Journal*, May 11: The ditch of this company is in fine condition, and carrying 1,200 inches of water, which it will continue to do for two months to come. On the Ward mine they are running two large pipes, the large holders being lifted out of the way by a water-worked derrick. Two partial clean-ups have been made in the mine this season, about \$9,000 being taken out. But little bedrock has been uncovered, and that little on the rim. It is of a shelly nature, and shows considerable gold. The product of mining claims is hard to estimate, but it is thought that the yield of the Ward claim this season will be between \$25,000 and \$30,000.

MINING operations all over the county are now becoming lively.

TUOLUMNE.

MINING ITEMS.—*Independent*, May 11: The Riverside is running night and day, Sundays and all. It is one of the best pieces of property in Tuolumne county. Have just commenced to run a new tunnel. Will have air compressor, Burleigh drills, and all the latest improvements. A friend of ours has recently struck a pocket—one lot we saw weighed brought down five pounds of gold.

THE MOUNT JEFFERSON MINE.—Increased attention is now being paid to quartz mining in this county, a business that has been strangely overlooked in view of the many promising ledges to be found here. Among the more prominent companies who have lately started in afresh here is the Mount Jefferson, who own a valuable quartz mine situated at Groveland. The owners of this fine property, who are mostly residents of San Francisco, are now engaged in pumping the water from the old works, and taking other preliminary measures for putting the mine in good condition for renewed production, satisfied that they can soon place it upon a dividend-paying basis. This claim was worked in former years and paid well, much of the ore having been reduced in arastras by the Mexicans, an evidence that it must have been of good grade and easily treated. The present owners have sent up a powerful Wilcox steam pump already in position, and which it is expected will soon rid the mine of water, after which with some repairs required on the mill and hoisting works, the entire property will be in splendid condition for active and profitable production. They have already a first-class steam quartz mill with steam hoisting works erected at considerable expense. F. G. Cleland, an experienced quartz miner, has been put in charge of this property, a guarantee that it will be managed with economy, honesty and skill. The property here is abundant, and can be mined and milled at very moderate cost. The principal owners of the Mount Jefferson are Messrs. Condee, Cleland, Fassett and Shattuck, all well known business men at the Bay, and whose example of opening up some of the many quartz mines of the interior, might well be followed by other of the citizens of San Francisco.

Nevada.

BELMONT DISTRICT.

WILL RESUME.—*Courier*, May 4: The Combination mines at Belmont will be started up soon. These mines, which belong to a New York corporation, have lain idle for several years. At one time they were considered as among the best mines of this State. The company owns one of the finest quartz mills in Nevada. A force of men are cleaning out the mine, and steam has been gotten up in the mill.

OTHER DISTRICTS.—Work is progressing finely in the mines of Danville district, in this county. Alex. Trippell, the Superintendent, is determined to push the work of development as rapidly as possible. The snow is fast disappearing, and the miners can now work without interruption. The prospects so far are encouraging, and it will not be a matter for surprise to learn of a rich strike being made there soon. Prospectors in Jett district are hard at work. Several pieces of rock were brought into town this week and assayed.

BRISTOL DISTRICT.

HILLSIDE.—*Pioche Record*, May 4: Exploration is being pushed in this mine, with steady ore extraction. Arrangements for starting the furnace are being made as rapidly as possible; such as cutting wood and making charcoal, as it is the intention to start the furnace on a test run of 30 days as soon as all arrangements are completed.

DAY MINE.—Nothing new here since our last report. Sinking the winze is progressing favorably, the rock being of a nature unfavorable for making speed; still in low grade ore; total depth below the tunnel 112 feet. The lower tunnel is progressing steadily at the rate of 12 feet per week—ground very hard.

CHERRY CREEK DISTRICT

STAR COMPANY.—*Independent*, May 4: This company shipped to-day to San Francisco 10 bars of bullion, and for the week a total of 15 bars, worth \$11,000. The shaft has attained a depth of 76 feet below the 360 level, and if nothing happens the company will be ready to drift on the next level within two weeks. On the 360 level the east drift has attained a length of 190 feet, and the west drift 342 feet, or a total of 532 feet of drifting along the ledge. The winze connection being made between the 270 and the 360 levels is almost completed.

MARY ANN.—A body of ore has been struck in this mine assaying from \$68 to \$339 per ton. As soon as possible the six-stamp mill of the Geneva company will be started up on this property.

EUREKA DISTRICT.

MINING ITEMS.—*Sentinel*, May 11: The developments on the third level of the Jackson continue, and the mine is looking splendidly. Rapid progress is being made on the connecting drifts between the K K Con. workings and the Phoenix shaft. The Humburg developments are the largest and best ever found in that property. The extent of the ore bodies is not yet determined, but enough is in sight to secure a long and profitable run. The lessees are taking some fine ore from the Union and Charleston mines, on Prospect mountain, and shipping the same to the Richmond furnaces for reduction. The mines are situated in the same belt with the Emmett, Metamoras and El Dorado, and are

developing splendidly. These locations have proved themselves to be among the richest on Prospect mountain.

THE WILLIAMSBURG MINE.—This property is proving itself to be one of the best locations in the district. In a quiet sort of way it is adding its quota to our bullion product, and is opening up a very large ore body. Unfortunately the percentage of lead contained in the deposits runs very high, and are not available at the present prices of that metal. At least 5,000 tons of ore that will carry 60% of lead, and assay \$30 to the ton in silver, is in sight. This leaves no margin for profitable smelting. In consequence the higher grades have been assorted and sold to Salt Lake purchasers for shipment. It looks as if Utah would absorb all our custom ores. Mine owners state that ore buyers from Salt Lake are very liberal in their terms.

THE TWO BIG MINES.—The Richmond company are receiving large quantities of wood for use at the refinery. Over 1,000 cords are stacked up in the neighborhood of the works. The Eureka Con. mine never looked better since its discovery. There is 12 months' dividends in sight, and a promise of still greater developments.

ORE AND CRUDE BULLION.—The value of the crude bullion shipped daily from the Eureka averages over \$30,000, the number of carloads varying from 12 to 20.

POTTS' CHAMBER ORE.—There is some slight difference in the estimation of the value of the ore taken from the Potts' chamber by the Richmond company. The Eureka Con. company brings suit for \$2,500,000 damages, and Secretary Morrison, of the Richmond company, writes to the London directors that the company is in a position to prove that the market value of the ore removed was under \$20,000.

HUMBOLDT DISTRICT.

BATTLE MOUNTAIN.—*Silver State*, May 11: The new furnaces ordered for the White & Shiloh will be on hand about the middle of the month. The Avalanche, Trinity and some others of the Galena mines are being worked with good results, promising prosperity for the camp the coming season.

BARTLETT CREEK.—A ledge has been found here lately that assays well in silver. L. Vary is engaged in extracting ore from the Montank and working it in an arastra. The ore yields by this process from \$80 to \$100 per ton. At Snow creek, placer mines are being worked, but with what success we have not learned.

PARADISE MINES.—The excitement here still keeps up. Several fine looking ledges have been discovered and located within the last week or two. The Mammoth mine, recently discovered within a mile of the Big Prize, is proving to be the richest as well as the largest yet found in that locality. It has been named the Mammoth in consequence of the large size of the vein, which crops out boldly on the side of the mountain. It was located some time ago, though never prospected and virtually abandoned by its former owners.

Arizona.

YAVAPAI COUNTY.—*Enterprise*, May 4: Good news from Humburg district. Tiptop, Foy and other mines looking well. Plenty of ore at the mill, which is kept constantly at work. Several new houses being erected near mine and mill.

PECK DISTRICT.—Mill running all the time. Mine yielding plenty of ore that pays about \$700 to the ton. Miners stopping in tunnels and blasting in the winzes. Wood coming in fast. The town of Alexandra is growing. A great many prospectors in the district.

BRADSHAW DISTRICT.—The Tiger lode is astonishing the natives. People arriving there from everywhere. All surprised to see such immense bodies of good ore. Cougar, Lorena and other mines in the district are looking very promising.

TURKEY CREEK DISTRICT.—Not much doing here, just now. The Compton mine is doing splendidly.

HASSATAMPA DISTRICT.—Crook mill doing good service. Owners of claims on the Crook lode are taking out ore. Richard Sparling and others doing same on other mines. Some activity noticeable around the Senator mill and mine.

GROOM CREEK.—Ledges opening out nicely. All hands hoping that the Aztlan mill will speedily start up.

WALKER DISTRICT.—Elliott & Co.'s four arastras—run by steam—keep going, night and day.

BIG BUC.—A great many capitalists nosing around. McKinley will soon start work on the Silver Flake. McCarthy Bros. looking to see what they want.

BLACK HILLS.—Empire mine spreading itself. Other mines following suit. Large party of second-hand miners out there now, looking for holes to crawl into.

PLACER miners doing well on Hassayampa Lynx and other creeks.

R. J. CARTER and J. B. Morey have recently located a placer claim of 120 acres on lower Hassayampa; also, 1,000 inches of water. They will incorporate and put up hydraulic works. Gravel said to be rich.

PECK COMPANY will soon contract for large supplies of wood and salt. Their whim will shortly be ready for the hoisting.

The foregoing districts are all close to Prescott, are pretty well watered and well timbered. Climate—finest that can be imagined.

The Silver King mine has been turning out during the last few months about \$50,000 per month at a very small cost.

THE ENGINEER.

A Magnificent Arch Bridge.

Sir Joseph Bazalgette has presented to the Metropolitan Board of Works of London a report favoring the construction of a new bridge over the Thames, near the Tower. The bridge he recommends is a single arch of 850 feet span, by far the largest arch span in the world. The following is an extract from his report: I have considered the relative suitability of various forms of bridges, viz., suspension bridges, girder bridges and arch bridges, and of the material of which such bridges could most advantageously be constructed. Suspension bridges, although in many instances economical for wide spans, are liable to considerable vibration with heavy traffic, and seem to be unsuited to this locality owing to the great height that would be required for the towers, the character of adjoining banks and the length of the anchor chains. A straight girder bridge could not conveniently be built to cross the river in one span, and such form of construction would render it necessary to place two piers in the river as above described. An arched iron bridge of one span, with a roadway over it, would have a very handsome appearance, but it would necessarily form a very flat segment, so that the strain upon the metal and thrust upon the abutments, would be very great, and it would therefore require a heavy mass of metal, and become very costly. It would, moreover, unnecessarily reduce the headway for shipping near to its haunches. I am of opinion that a trussed girder bridge of one span, in an arched form, with the roadway carried across the arch, and suspended from it, will probably afford greater advantages than any other sort of bridge. The East River bridge now in course of construction between New York and Brooklyn will be the largest span bridge in existence. It is a suspension bridge with a central span of 1,600 feet. The proposed suspension bridge over the Fifth of Forth, which it is expected will shortly be commenced, is designed with two spans of 1,600 feet each, but the platform which it is to carry will be only one-fourth of the width, and designed to carry only one-fourth of the moving load that the Tower bridge is intended to carry, so that the total weight of the greatest span with the full live load upon it will not be more than one-third of the total weight of the Tower bridge when so loaded. The Tower bridge would be the largest arched bridge in existence.

Great advances have of late years been made in the manufacture of steel, and it is now produced at a cost not much in excess of that of iron some few years back, whilst its much greater strength to resist both tensile and compressive strains enables the weight and cost of the structure formed of it to be greatly reduced, and renders it especially suitable for bridges of large span. The St. Louis bridge which has recently been built over the Mississippi is a bridge of the same character, and is constructed of the same material, although its width and span are not so great as those of the bridge now proposed.

It is intended to make the width of the new bridge 60 feet, subdivided in two footways of 12 feet each, and a carriage way of 36 feet. The Tower bridge will, therefore, be in all six feet wider than the London bridge, which is 54 feet, the carriage-way being 34 feet 8 inches, and each of the foot-ways 9 feet 8 inches in width. I estimate the cost of such a bridge, if erected in three spans, including the cost of forming approaches and the purchase of the property required, at about £1,100,000, whilst the cost of such bridge, if erected of one span, which I recommend, would be about £1,250,000.

How to Build Wooden Rails for Steam Roads.

As we have lately described, there seems quite a disposition now to build wooden railways for steam locomotives in regions where wood is plenty, and the expense of iron cannot be borne. This has been so far reduced to practice that Eastern locomotive builders are announcing styles of locomotives which are especially adapted to use on wooden rails. One of these firms have prepared an interesting statement of the best timber to use in these roads and how to lay them. The kind of timber to use is of course a local question to be decided according to available supplies. It is said that the best wood is maple, laid with the heart up; hard pine is used in the South. The simplest form of wooden rail is a stringer cut in 16 to 20 feet lengths, and of such cross section as the kind of wood or weight of engine requires. Six inches square stringer is the size we would generally advise, although five inches face by seven inches depth is as good. Four inches face by six inches depth, or five inches square will answer for our smallest engines, if the wood is good; still smaller sizes may be used by placing the cross-ties close together, say two feet or two and a half feet between centers; for large stringers, four feet between centers will answer. When worn out on the top the stringer may be reversed, and when again worn may be used for ties.

The ties are easiest fitted and laid if made uniform, and of about the same size lumber as the rails; six inches square is heavy enough. Any cheap lumber not specially liable to decay will do. Ordinary hewn ties may be used,

but not being uniform are less convenient for cutting out recesses for rails. They should be at least three feet longer than the width of the track between rails.

The ties must be cut out accurately and uniformly to receive the rails. The recesses should be about three inches deep, and be at the top face of the tie an inch, and at the bottom of the recess one and one-half inch wider than the rail. The inner faces of the recesses are perpendicular, and the distance between them is the gauge of the track. The bottom of the recess should be level, and ties laid well to afford proper bearing for the stringer.

Wedges made of any cheap wood, or better, of ends of stuff left from rails, are driven on the outsides of the rails. They are made of right shape to fit the space left; the reason for making this space wider at the bottom than at the top is to keep the wedges from working up, so that the rail may be held securely in place.

The stringers must be arranged to break joints on the ties. Both stringers should not break joint on the same tie; the stringers are sometimes sawed off diagonally instead of perpendicularly, so as to be lapped and spiked together. The lumber for a hard pine wooden road costs about \$450 per mile.

With another style of wooden road the stringer is made of hemlock or any cheap lumber, and a maple strip four to five inches wide and two and one-half to three inches thick is spiked on to the stringer. By this plan, such a part of the rail as is worn out may be removed without taking up the stringer. This maple strip may be replaced by a T iron rail considerably lighter than would be required if laid directly on cross-ties. We would strongly advise this instead of strap iron.

A wooden rail is very slippery when wet, and hard to keep clear of snow and ice in freezing weather. On very bad curves and steep grades a wooden rail is impracticable, and iron must be used.

A locomotive has but one-half or two-thirds the power on wood that it has on iron; the friction useful for traction is less, and the flange friction is greater. Locomotives for wooden rails require to be very strongly built and to be evenly balanced; the weight should be less and the drivers larger than for the same size cylinders on iron rail.

Generally speaking we would dissuade any one from laying a wooden rail. In cases where lumber is cheap, and iron very dear, it may be advisable to operate a wooden road, as for instance where a cheap improvement on an ordinary country wagon road is needed. To do any considerable business on the very best wooden road that can be built, will in the words of one of our customers who has tried the experiment, "require a very rich concern." Parties using animal power for hauling on a wooden rail, if content not to greatly increase the load, may effect a very considerable saving by using a locomotive; but for transportation upon a scale of any magnitude, wooden roads are very unsatisfactory and almost impracticable.

A NEW ROUTE TO THE PACIFIC.—While the Texas Pacific enterprise is temporarily resting at Fort Worth, awaiting the slow and uncertain action of Congress, the *Railway Age* says a determined forward movement toward the Pacific has been commenced in another quarter. The new rival is the Atchison, Topeka & Santa Fe company, a powerful and prosperous corporation with over 800 miles of road already in operation from the Missouri river to Colorado. This company has long been looking forward to the feasibility of extending its line into the rich regions of New Mexico, and the recent accession to its active direction of a manager noted for his aggressiveness, has been followed by a vigorous movement southward. The only practicable entrance from the southeastern corner of Colorado into New Mexico is through Raton Pass, a little south of Trinidad. This pass the Denver & Rio Grande company intended to make use of for an extension from Trinidad, in the same direction, but a force from the Atchison, Topeka & Santa Fe captured it at midnight a few weeks ago, and is now industriously engaged in preparing the bed for a branch of that road from the main line at La Junta.

MINING ENGINEERS INVITED TO GERMANY.—The Prussian Minister of Commerce, Industry and Public Works, Dr. Acenbach, has addressed the following official communication to Professor Egleston, of the School of Mines, Columbia College: "In the expectation that American mining engineers attending the Paris Exposition this year will extend their tour of observation to Germany, for the purpose of inspecting its industrial establishments, and being desirous to reciprocate the friendly reception accorded to German artisans, and especially to the commissioners sent by me, on the occasion of the Centennial Exposition at Philadelphia, I have directed that technical works and geographical, topographical and other maps be open for inspection to our American visitors in the library of the Royal Mining Academy, Lustgarten No. 6, and that information can be obtained there regarding the most desirable routes to take, and the location and importance of the industrial establishments which the visiting engineers may desire to inspect."

TUSCARORA.—Latest intelligence from this district represent the mines as showing some improvement, and the prospects of the camp every way better.

United Efforts for Homes.

If our unemployed workingmen would devote one-half the effort in uniting to secure themselves homes by building up colonies on unoccupied lands, which they now put forth in applauding men with communistic ideas, the coast would be the better for it. If our large capitalists, who would consider any contribution worth making if it would foster the present discords among the workingmen, so that all their schemes would collapse, would but lay down half the money to help these landless ones to secure small but productive homesteads, they would gain a surer and quicker freedom from the seditions which hazard all their enterprises and endanger all their property. There was a world of truth in an Eastern comment on communism in this State, which was telegraphed a few days ago, to the effect that there "was little danger of a serious communistic outbreak in San Francisco, because too many workingmen own their own homes."

It is true. It is wonderful what a change is wrought in a man by the owning of a freehold. Nothing we have ever read in praise of the wholesome effect upon a man's aims and ambitions of the possession of a piece of land which is all his own, from zenith to antipodes, has done the subject too much credit. It is a wonderful balance to place upon human inequalities and tangles, this charm and responsibility of home owning. It engenders a feeling of actual oneness with the cause of law and order which no homeless man can appreciate. It sends a flush of independence through the heart and life. It awakens the mind to thoughts of the need of the protection of just laws and pure government. It brings ideas of political and social economy, crude though they may be, direct to the brain. It makes him a seeker for the real and a hater of the visionary in all questions of property and its protection. Mistaken may be his politics, wild his religion, rude his life, but when he plants his foot upon the warm surface of his dooryard, or turns the fertile soil of his farm, he is true in his devotion to it and strong in his hatred of any communistic fallacy which would endanger his claim to his own.

It is plain that one of the surest ways to draw from the ranks of the malcontents, is to bring men under the influence of ownership. Of course it is much easier said than done, and yet the saying is worth the while, because the proposition is not altogether impracticable. Something is being done each day. Men are continually forcing their own way to the right side of the line. There are two possibilities which present themselves to our mind. One is that they might do this far more generally of their own effort and accord. Another is that there might be a better effort made to help them to it by systematic action among those whose interests demands such action and its influence.

First, what can landless men do for themselves? By co-operation, by united effort they can do what each, single-handed, could, perhaps, never accomplish. By uniting in the form of a colony, they could make one man do the work of a hundred in seeking out a place where, perhaps, a hundred families could, by working together, build up a prosperous neighborhood. They might have to move hundreds of miles to find good land to take from the Government. That is nothing; the last generation moved thousands of miles in the same pursuit, and were successful. Hardships, economies and self-denials lie in the path? Yes; but the last, yes, and many of the present generation have triumphed over them. The pioneers of this State could not find the fortunes they sought, just beyond their eastern garden walls. No; they had plains to cross, or oceans to navigate. Should their successors, then, expect to pre-empt farms or locate mining claims on Kearny street? If the old will to succeed still exists in men's minds, what is there that shall deny them success? As we have said, if one-half the effort were made by homeless men to seek out places where they can develop homes, which is now given to draining their purses, and shouting themselves hoarse in adherence to demagogues, the result would be accomplished. Let them combine their small resources. Let them save the dimes as many a man saved them 25 years ago to pay his way to California. Let them then thus create a small fund which will pay all the expenses of preliminary examination and location of land wherever it may be found, and then let them make their way to this promising land and develop it. It is harder than city loitering it is true. It is hard. It has been done. It can be done again.

We have said that more might be done by men of means to insure the popular safety, by turning idle mischief-ready hands to productive, self-supporting home making. The Government sets the example and does its part. Wealthy citizens could unite and make efforts to make this Government generosity available to the poorest men, by aiding them until they become self-sustaining. We have just heard of an Eastern movement to secure this desirable result. An important benevolent enterprise has been inaugurated at Boston in the formation of a board of aid to land ownership, an object of which is to colonize worthy laboring-men, who are out of employment, in order that they may earn a living by tilling the soil. The association is to consist of 24 members. There will be an advisory board of 200. The association proposes to purchase land in large tracks, and to sell it in alternate sections to

colonists at cost, supporting those who have no money until they are able to pay for their fields by the labor of their hands. These lands are to be settled under the supervision of competent superintendents, who will instruct novices in agriculture how to get their living from the soil, and anti-liquor and gambling laws are to be rigidly enforced. Tenders of co-operation have been received from various railroad and land companies, and a committee has started for the West and South to examine various tracts to which their notice has been called.

This is, apparently, a practical enterprise in which the rich men of California could engage. Thus could they transform into responsible citizens an element of our population which is now a danger to itself and to the general prosperity. Thus could our holders of surplus wealth serve themselves and the State. Is not the proposition worth consideration?

Wild Animals During Drouth.

The sufferings endured on account of the drouth were at times almost terrific. The throats of the oxen were so parched that they could not low. The dogs suffered even more than the cattle. Nor are the wild animals exempt from the plague of the land.

When water becomes scarce in these thirsty plains, the whole of the wild animals that inhabit them congregate around any pool that may be left, for with very few exceptions all have to drink once in 24 hours. The lions, which follow the game, thus are led to their drinking places not only to assuage their thirst, but to satisfy their hunger.

To watch one of these pools at night, as I did in the northern Massara country, is a grand sight, and one never to be forgotten. The naturalist and the sportsman can here see sights that will astonish them, and cause them to wonder at the wonderful instincts possessed by the animal kingdom.

At such watering places the small antelopes invariably drink first, the larger later on, and with them the zebras and buffaloes. After these come the giraffes, closely followed by the rhinoceros, and next the elephant, who never attempts to hide his approach—conscious of his strength—but trumpets forth a warning to all whom it may concern that he is about to satisfy his thirst. The only animal that does not give place to the elephant is the rhinoceros; obstinate, headstrong, and piglike, he may not court danger, but assuredly he does not avoid it. The elephant may drink by his side, but must not interfere with him, for he is quick to resent an insult, and I am assured that when one of these battles takes place the rhinoceros is invariably the victor. The elephant is large, of gigantic power, but the other is far more active, while the formidable horn that terminates his nose is a dreadful weapon when used with the force that he has the power to apply to it. I have been told on trustworthy authority that a rhinoceros in one of those blind fits of fury to which they are so subject, attacked a large wagon, inserted his horn between the spokes of the wheel, and instantly overturned it, scattering the contents far and wide, and afterwards injuring the vehicle to such an extent as to render it useless.

The lion is not tied to time in drinking. After it feeds it comes to water, but it never would dare to interfere with the rhinoceros or the elephant. Where the buffalo exists in numbers it is the principal prey of the lion; in other localities antelope and chiefly the zebra are its food.—*The Great Thirst Land.*

ROYAL JEWELS AT THE PARIS EXPOSITION.—The English crown diamonds have been sent to the Paris Exposition, and are valued at \$85,000,000. They are in a strong iron chest and are guarded by eight sentinels day and night. A diadem of 86 diamonds of various sizes has in the middle the Koh-i-noor, alone valued at \$320,000. There is also a collar of 108 diamonds, in the center of which is an emerald, said to be the purest and most beautiful known. A second diadem is a blending of diamonds and emeralds. In the center is the large Kaudavassy diamond, valued at \$60,000. It would be rated at a higher sum only for a slight defect. These, and many other jewels of the kind, belong to the English crown. A portion is used by the Princess of Wales on special occasions; the others are reserved for the Queen. The Kaudavassy was formerly the eye of a one-eyed Hindoo deity, and has been only lately added to the collection. The French Commission are constructing a strong room for the State jewels. According to the *Journal des Debats*, it is about 12 feet deep and 10 feet or 11 feet square. The sides of the pit are thickly cemented, and it has a double iron floor, with pipes, by means of which it can be flooded in case of fire. The jewels will be exhibited in a glazed case of beautiful workmanship, a casket worthy of the gems; this will be let down into the space below immediately the Exhibition doors are closed, and covered with a heavy iron trap door, upon which two especial guardians will place their camp beds.

NO ROOM FOR MORE LABORERS.—The Eureka Sentinel says that 1,500 miners and laborers are employed in this district, and we have no work for others. Laborers are flocking here from all over the State, but they come only to meet disappointment. According to the Washoe papers there is a like surplus of laborers in the Washoe mines.

Sweepstake Plow Works.

On Friday of last week we took a run to San Leandro, Alameda county, to see what the Sweepstake Plow Company is doing in the home manufacture of agricultural implements. We found the works running a full force of men and turning out work as rapidly as is consistent with the high standard of excellence which the institution builds its success upon. Mr. F. A. Hill, who is known as a leader among the experienced manufacturers and successful inventors of the State, is still at the head of the works and gives his constant attention to all matters of construction and general business. Mr. Palmer, who conducts the office branches of the establishment, has his hands well filled with important work, and the wide area which is covered by the shops is resounding with the hum of industry.

Especially attention is now being paid to the building of headers. They are manufacturing the Baxter patten, which has been found very satisfactory in its working. Improvements have been introduced and particular effort is made both by designing and by quality of material to turn out a header of unusual strength, solidity and durability. Such qualities will be demanded in machinery to handle this year's crops, and anything short of powerful and effective implements will prove a vexation and a loss to the grain grower. The finger beam of the Baxter may be adjusted to run close to the ground, and it will pick up and elevate all heavy or lodged grain that can possibly be reached. It is fitted with an improved "double single gear," that is, the sickle and reel are run by one gear and the draper by another. Thus the draper may be stopped while the sickle and reel are still in motion, and the loaded wagon may be driven out and an empty one driven in without stopping the cutting. This arrangement enables the man who has timber or stumps in his field to cut all around them, and then start the draper again after the obstruction is passed and the wagon comes into line again. Fuller information concerning the header may be had from our advertising columns.

Another leading branch of the company's work at the present time is the building of spring wagons. These are being turned out in a variety of handsome and effective styles. There are airy and graceful buggies and phaetons, and very strong spring wagons one and two seated, covered and open, light and heavy express wagons. One pattern we noticed was a light business wagon, with springs hung upon jacks, so that they take up what they lengthen out, and consequently sustain a heavier load than springs attached in the ordinary way. Another pattern is a light side spring wagon, put up with patent equalizing rods which hold the body level when unevenly loaded and thus doing away with the tendency to tip sideways as in common side spring wagons. Another style is a heavy road or mountain buggy, with Hill's patent single-leaf spring connected with the equalizing rods. This is furnished either open or covered. Other patterns, into which the improved spring and equalizers enter, are a family wagon and carriage, a heavy express wagon, a three-spring long-panel bed wagon, with or without top. All these styles and varieties of wagons are made here, in a dry climate, from the best imported material, and while they do not compete in price with Eastern made wagons, they are put forward as much more durable because of the extra care in their construction and the more satisfactory conditions for durability under which they are produced.

The fine plows of Mr. Hill's designing are still selling in large numbers, although this is not strictly the plowing season. The Gillis horse-power, of which we have several times made favorable mention, is one of the specialties of the company. It is being widely introduced and is giving great satisfaction as a simple and cheap motor for raising water for irrigation and stock purposes.

We also were much interested in an iron wagon, the running gear being of Mr. Hill's invention, and the wheel of the Duval patent. It has a two-inch axle and is lighter than a wooden wagon of the same capacity. It is built on the truss principle throughout and this brings the weight of the load upon shoulders near the hubs, and not upon the central parts of the axle, as in wooden wagons. It has other points of strength and advantage which appear upon inspection, but which we have not space to describe at this time. It is a very interesting piece of mechanism and is being put to the test of actual work, with good show of success.

Mr. Jacob Price, of the Price Press Company, is putting up a new lot of his well-known hay presses, to meet the increased demand for this class of machinery in view of the heavy hay crop. The Sweepstake Company are also making for him an extra large excavator, for use on a 30-foot canal in Arizona. It is to have a capacity for excavating 600 yards of earth per day, with one man to manage it.

The Sweepstake Plow Company is a home manufacturing institution which is worthy of practical encouragement. A large number of men are employed and it promises to be one of the corner stones in our future as a manufacturing as well as an agricultural State.

Useful Information.

Agricultural Statistics.

In the House of Representatives recently, Mr. Burchard of Illinois made a speech in favor of repealing the bankrupt law. During the course of this speech he presented a summary of the increase in agricultural products since 1870, in order to show the material prosperity of the country. His figures were as follows:

	1870.	1878.
Acres cultivated.....	90,771,003	121,350,000
Horses.....	7,145,370	19,329,700
Mules.....	1,125,314	1,937,500
Milk Cows.....	8,985,332	11,309,100
Cattle.....	14,885,276	19,223,300
Sheep.....	28,477,041	35,740,500
Pigs.....	25,134,569	32,262,500
Wheat, bushels.....	235,854,700	300,000,000
Corn, bushels.....	1,094,255,000	1,340,000,000
Oats, bushels.....	247,277,400	405,200,000
Barley, bushels.....	20,295,400	35,600,000
Rye, bushels.....	15,473,000	22,100,000
Tobacco, pounds.....	250,028,000	480,000,000
Hay, tons.....	24,525,000	31,500,000

Mr. Burchard further states that the cotton crop this year will equal that of 1873, which was the largest which has been made since 1860. The net result of his statistics is that since 1870 the number of acres under cultivation in the country has increased by one-third, the live stock by from one-quarter to one-half, and other staple products in equally striking proportions. In view of these facts, it is easy to understand why the balance of trade for the past three years has been in our favor, and why the premium on gold has declined.

THE UMBRELLA.—From time immemorial the umbrella has been in use. At every point of Oriental story one encounters the symbolical umbrella in literature and art. In the fifth incarnation of Vishnu, when the god goes down into hell, he hears in his hand a sunshade. In like manner old bas reliefs represent Dionysus bearing a parasol when he is descending to the infernal regions. To be a King in the East has from the remotest antiquity implied a right to hear an umbrella; and to be preceded by umbrellas has signified royal quality in the persons following them. Indeed, the Eastern title with which we are more familiar than any other signifies King of the Eternal Kingdom. Satray is an abbreviation of a title signifying Lord of the Umbrella. No English fox hunter would care to ride to the coverside at the tail of a company of walking or mounted umbrella bearers; but when the Emperor of China goes forth to hunt he is preceded by 24 umbrellas. The Greeks used the umbrella as a symbol in some of their sacred festivals, and put it in the hands of gentilewomen. Bestowing it on their womankind of high degree, the Romans also elevated it in their halls of justice as a symbol of authority. A red umbrella was the symbolical canopy under which the Roman judge sat in the basilikon. The Cardinal's scarlet bat is but a modified umbrella. That our English umbrella has the same magnificent descent is shown by its name, which signifies sbademaker. Although the English did not invent the umbrella, they have done much to develop and bring it into perfection. Between October, 1786, and July, 1871, no less than 292 improvements on the ordinary walking stick were patented in England, and though some few of these patents refer to undraped batons, some 270 of them are for portable canopies. With so many fertile brains at work on its construction, the umbrella of the future must reach perfection.

PETROLEUM AS WAR MATERIAL.—Now that England and Russia are on the ragged edge of war, it is interesting to notice that the English Naval Architects are busily discussing all kinds of war construction and material. At the last meeting of their association a member read a paper "On Crude Petroleum Experiments for Purposes of Naval Warfare." There are various petroleum equipments, the best known of which consists of a steam cylinder, 15 feet long by 12 inches in diameter, to which is attached a pipe terminating in a nozzle at the bow of a torpedo boat. From this cylinder the Greek fire is ejected with great force, under a pressure of about 500 lbs. to the square inch. The writer believes that instead of counselling "no quarter" as a corrective of the use of Greek fire in modern warfare it should be reckoned as a factor in hostilities, and that steps should be adopted to provide our warships with means of defense against it. It was intimated in the paper that there are grounds for the belief that Russia has already recognized the validity of petroleum in war, and would probably have used it in the late contest if the experiments which led up to its adoption had been concluded in time. Admiral Selwyn, who expressed an ardent hope that warfare would eventually become so scientific as to be impossible, questioned whether a launch in attacking an ironclad under cover of the smoke of burning petroleum would not suffer most. He hoped the matter would be gone into in this country, for it was being well considered on the Continent. Mr. McIntosh went into a long description of what might be done by attacking land fortifications by the aid of lighted petroleum in a favorable wind. Dense fumes would drive the men from the casemates, while a small vessel with long range guns could destroy all the shipping in the harbor. Petroleum could also be used in shells, but he could not recommend crude petroleum.

AN APPLICATION FOR SLIPPING BELTS.—The use of leather belting is so much in favor that every device to prevent the drawbacks to which it is unquestionably subject, especially in careless hands, ought to be welcome. Heat and damp are two unavoidable conditions which exert an unfavorable influence upon leather. By the use, leather belts are dried up and cracked; by the other they are stretched unduly and have to be tightened, putting a strain on the shaft-bearings which they are never intended to sustain. Loss of power, extra wear and tear, and, worse than all, rapid deterioration of belts are the consequences. There are some common remedies for these defects of beltings, chief among them being powdered resin, which is applied to the inner surface of the belts, to make them "bite," much as a fiddle-bow is "roined" for the same purpose. In both cases the practice has the same termination—the resin accumulates as a hard layer, which has to be removed, sooner or later, not however before it has, especially with belting, done a considerable amount of harm. The fine dust produced in some factories, as in grinding or saw mills, has a similar effect, settling on the pulleys, and forming a layer of dust which prevents proper contact and causes a loss of adhesion. These drawbacks, says *Iron*, can be obviated by the use of a semi-glutinous, semi-oiled medium, such as has for many years been used in Switzerland, and is now being introduced in England. This compound, besides securing the right amount of adhesion, has the excellent quality of preserving leather. We are not informed of what this compound is composed, but the idea may set some of our inventors to study out a combination of substances which will answer the purposes.

SUBSTITUTE FOR SLATE.—The new composition proposed by Mr. J. A. Ditch, of Hastings, England, consists in mixing the various materials, or their chemical equivalents, in the proportions or near thereto, as hereinafter mentioned, for the purpose of providing, when applied as a coating to any convenient and suitable substance, a substitute for slate for building, writing and other purposes. The mixtures and proportions for coating substances for exterior work are—One quart of methylated spirit or its equivalent, $\frac{1}{2}$ lb. gum shellac, $\frac{1}{2}$ lb. flour of emery. For coating substances to serve as writing slates, add powdered glass, rotten stone, or pumice stone, together with lamp black or Paris green sufficient to give the desired shade of color. Other powdered substances, such as chalk, brick, slate or stone, may be used for the purpose of giving a body or abrading surface to the composition. A convenient way of making writing slates is to coat millboard with the new composition, frame the board, and mount it on an easel so arranged that it can be closed and shut up when not in use.

CLEANING CLOCKS.—Common brass clocks may be cleaned by immersing in boiling water. Rough as this treatment appears, it works well whenever they stop from dust or thickening of oil upon the pivots. Boil in rain water, and dry in a warm stove.

GOOD HEALTH.

Dyspepsia.

A writer for the New York *Independent* gives the following notes on dyspepsia: When there is a failure to dissolve the food which presents itself to the different organs of digestion, either wholly or in part, we have indigestion or dyspepsia. This we have also if the process is protracted beyond the normal period. When the saliva is deficient in quantity or inferior in quality there is one kind of dyspepsia; when there is a failure on the part of the stomach to secrete the normal quantity or quality of gastric juice, there is another kind of dyspepsia; and when the fatty elements of food fail to come in contact with the pancreatic and intestinal fluids necessary to emulsify them, there is still another kind.

Dyspepsia means difficult or imperfect digestion, and it is evident that there are three varieties, depending on the kind of food concerning which the difficulty exists. There may be failure to reduce the starch to sugar, to reduce the albumen to albumenose (liquid albumen), or to emulsify the fat. These difficulties may exist singly or combined. Generally they are combined, every stage of the digestive process being faulty. This is caused in no small measure by imperfect mastication. This act being imperfectly performed, there is an insufficient amount of saliva mingled with the food, and the food is so imperfectly divided that the digestive fluids act upon them slowly on account of the small amount of surface which is exposed to their action, and in this way the whole process becomes retarded and imperfect. If "baste makes waste" in other things, it makes double waste when applied to eating. It not only causes waste of food; it causes waste of vital energy, on account of the increased demand which is made on the organs to perform a difficult task, while at the same time the system is robbed of that nourishment which, with far less expenditure of energy combined with proper mastication, it would obtain.

LIP SALVE.—Oil of sweet almonds, eight ounces; white wax, three ounces; spermaceti, three ounces; rhodium, fifty drops, and white sugar candy forms an excellent lip salve.

Use and Misuse of Carbolic Acid.

In San Buenaventura there was recently a case of the misuse of carbolic acid by the injection of it into a wound. This fact has led a correspondent of the *Signal* to lay down the authorities on the use and misuse of this substance, and to call attention to a fact, which every good physician knows, that carbolic acid is a dangerous medicine, and must be used with the greatest care and by skillful hands. Dr. H. C. Wood, Professor of Materia Medica and Therapeutics in the Pennsylvania University, says: "The free external use of carbolic acid is by no means devoid of danger. Indeed, in more than one case, it has caused death. Two young men suffering from scabie, [itch] applied externally each about one-half an ounce of carbolic acid in a watery solution, one of whom was soon found dead." Dr. Wood recommends as an external antiseptic 100 parts of water to 1 part of carbolic acid. The county physician, judging from the effects and from the statement of a physician present soon after the injection was given, must have used carbolic acid 50 parts, and water or olive oil 50 parts. Dr. John I. Reese, in his *Manual of Toxicology*, page 342, says a man was nearly killed by having an ointment applied to his body consisting of one part of carbolic acid and four of lard. Dr. D. Gross, the best authority on surgery in the United States, says: "In the performance of operations in opening abscesses, and during the removal of dressings, carbolic acid may be used as a *spray*, one part of the acid to 100 of water, the necessary manipulations being conducted in carbolic acid atmosphere, which does away with injections as formerly practiced." From the above authorities it will be seen when used externally, carbolic acid, in comparatively mild solutions, is dangerous to human life. When injected, as it was, in a strong solution, so that it was taken up in the circulation, as in the case of Mr. Maddox, we can only wonder that the man was not instantly killed. The effect of carbolic acid is to arrest circulation, and to destroy the life principle in the blood. Indeed, there is no greater and more effective destructive agent to animalcule. One drop of carbolic acid and 499 of water, makes a solution strong enough to instantly kill plant lice.

WHAT TO DO FOR CROUP.—*Hall's Journal of Health* says: Croup is so common a disease among children that it requires no description; it affects the windpipe. As it attacks suddenly, most often in the night, and as an hour's time may be all the difference between life and death, it is proper to state the most reliable course to be pursued until a physician be obtained. 1st. Keep the feet warm by having a jug of hot water kept against them; let them also be well wrapped up in woolen flannel. 2d. Have a bucket of water almost as hot as the hand can bear. Have two pieces of woolen flannel of several thicknesses, one being on the throat while the other is in the hot water, renew every two or three minutes, until relief is given or the physician arrives. The water in the bucket must be kept hot by the constant addition of boiling water.

COAL TAR FOR FLESH WOUNDS.—Mr. F. D. Curtis informs the New York *Tribune* of what he considers the best application for any and all flesh-cuts and raw sores. It is gas coal-tar, which may be had at any gas-works where gas is made from coal. A barrel of it, costing \$2, has been in use at the Kirby Homestead for ten years and is not half gone yet. Coal tar, when applied to a flesh-cut, shuts out the air and thus stops the smarting; it will also keep off the flies; it is very healing, and it is antiseptic, that is, cleansing, and will prevent the growth of prond-flesh. It is the cheapest, most healing and best application we have ever used. I have tested this remedy for several years on all sorts of cuts and sores with the most gratifying and successful results. It was an experiment at first, but now it is a necessity.

DEATH FROM AN ORANGE SEED.—A short time ago, says the *Journal of Chemistry*, an only daughter of a physician in Cambridge died, with symptoms of the perforation of the bowels. It was found that an orange seed was lodged in the appendage called "appendix cæci vermiformis," which is about the size of a goose-quill. This produced a perforating ulcer that allowed the escape of the intestinal contents. Inflammation ensued that could not be controlled. No doubt thousands of orange seeds are daily swallowed, but this case shows the need of caution, and the tremendous power that resides in our food for evil as well as good.

LIME IN THE EYE.—The evil effects of lime in the eye are well known, plasterers and white-washers not infrequently having their eyes seriously injured, if not destroyed, by the caustic power of the lime. Wells says: "If the patient is seen soon after the accident, an effort should be made at once to neutralize and wash out the lime by a weak solution of vinegar, with a free use of the syringe. Afterwards, cooling and anodyne lotions and general antiphlogistic treatment should be adopted."

TO REMOVE FRECKLES.—Grate horseradish in a cup of cold sour milk; let it stand twelve hours; strain and apply two or three times a day. Or mix lemon juice, one ounce; pulverized borax, one-quarter drachm; sugar, one-half drachm; keep a few days in a glass bottle, then apply occasionally.

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The Week.

Domestic events have moved on during the past week in their ordinary channels. The weather has been propitious for maturing the cereal crops, furthering hay making and all our other out-door industries. The abundance of water has greatly stimulated and extended the business of mining, promising at the same time to prolong the season of active operations. Through the partial utilization of our petroleum deposits, a new and somewhat important interest is likely to grow up in the southern part of the State, where an excellent lubricating and illuminating oil is being produced in considerable quantities. Many of those without employment during the winter are now getting work, and as the cost of the leading articles of subsistence has diminished with the prices of wages, our laboring population find themselves, as a general thing, in a tolerably easy and comfortable condition.

The Phoenix mine, Amador county, has ordered an outfit of drilling machinery from the National Drill and Air Compressor Company, consisting of a large duplex air compressor and a number of drills. Supt. Green ought now to have all the work he wants for that 80-stamp mill.

Things that Call for Correction.

Judging from the statements and tone of our exchanges, received weekly from all parts of the Pacific States and Territories, the business of mining for precious metals was never in a more prosperous and hopeful condition than at present. The note of despondence, heard even this early last year, has given place to a general expression of cheerfulness and content, the greater care and economy enforced by a season of drouth telling also beneficially on this industry. With a falling off here and there the metallic harvest will be more than an average, the total hulsion yield for the year being estimated at something over \$100,000,000. And now, when we appear about to enter upon an era of enlarged production and greater prosperity, seems a good time to take a look over our past history and see what there is in it calling for avoidance and amendment; for, with all our improvements and progress, our course has been marked by many blunders and mistakes. And in this we do not allude to those errors of judgment, which, in our inexperience and the novelty of our surroundings, might find some excuse, but to those that we have committed and still commit in the every-day practical prosecution of this calling.

And, first, of that wide departure from legitimate business principles that grew up with the introduction of stock operations on this Coast, and which, in the name and ostensibly in the interest of mining, has done so much, if not to retard, at least to bring that industry into questionable repute. We are not going to inveigh against the practice or business of dealing in mining shares wherever or however conducted. Let those who choose to engage in that vocation do so, but let it be understood that it has no necessary connection with the business of gold and silver mining, or rather, that, as usually conducted, it is antagonistic and hurtful thereto. And since these two callings have no real connection we should not suffer them to be longer associated in the popular imagination. It is claimed that assessments for carrying on mining developments cannot be collected except under the stimulus of speculation or a prospective "deal." The answer to this is that the mines that can be opened up only through this unwholesome excitation had better remain undeveloped. All we wish to be understood as saying, however, is that the financial ruin that has overtaken so many who have adventured their means in stock operations should not be attributed to mining itself, and to protest against these losses being charged to its account; adding this word of advice to miners themselves, better trust to the pick and gad to bring you out than seek to get your claims represented on the Stock Board or allow them to be controlled by share manipulators and sharps, who, if you have anything worth going after, will assess you "out of your boots."

But it is not only stock speculations in San Francisco that are to be avoided; there are many abuses in the field that call for correction. Mining to be made generally profitable must be carried on with more care and economy than has heretofore been observed on this coast. The services of more patient and capable men, especially in the reduction department, must be secured. We do not work our ores with enough cheapness or closeness. There is no longer any good excuse for this. Chemically our ores are not essentially different from those found elsewhere, and we have now had a somewhat lengthy experience of our own superadded to that of other countries. It is time we were doing less costly and more effective work in this line. In the matter of curtailing expenses, retrenchment should be practiced in everything except the mere item of labor. It is the dead weight we must try to get rid of—the fancy offices, useless officials, etc. Our mines—no mines can stand up under this burden of expenditure. It is too much to ask of them—more than we would require of any other business. We must order a halt on this line and do it at once.

It is a bad habit our miners have, this of rushing in great numbers to localities in which a rich ledge has been discovered or other mineral strike announced, congregating there often largely in excess of what either the labor demands or the prospects of the place will warrant. In this way these new districts, with all their resources, come to be about the poorest place to which either the workingman or the prospector can go. Indeed, the man who sticks closest to the old camps is apt in the long run to do the best. Of this we have had many notable examples here in California. In alluding to this evil, we are reminded that the local press is apt to represent these strikes occurring in the neighborhood in colors a little too glowing, considering how prone our migratory population are to accept everything they see in print as simple and unadorned fact. It is to be feared, in fact, that we are all a little given to exaggeration in these mining matters, as witness the daily discovery of so many Comstocks and veritable Bonanzas at all points of the compass. A little less hyperbole in this department of news would be agreeable for a change, and in the long run answer, perhaps, just as well. If a claim or camp possess merit, it is sure to be found out and appreciated, while there is hardly a defunct district in the country but has some day, or another been unduly puffed. Let us work more and "blow" less.

The Grand Musical Festival.

It is fitting that a year of great promise should be a year of song. As our grain fields are maturing their heavy produce and as our mining and manufacturing industries are feeling the impetus of favorable conditions, it is proper that our people should embody their feeling in an outburst of melody, than which grander, perhaps, was never heard upon the continent. Arrangements are being pushed forward which promise that the great May Festival, which has been announced before in these columns, will be in every way successful—a credit to the musical ability of our coast and to those who are giving time and effort to bring it together. At Mr. Bugbee's office in the Nevada block everything is in a bustle of preparation. Communications are pouring in from all quarters announcing the progress of rehearsals among the musical societies of the interior, and the interest of the people in the coming event. The sale of season tickets is immense, and the running of excursion trains from Stockton, Sacramento, San Jose and Salinas, and excursions by water from Portland, will give all a chance to attend the festival at a reduced rate.

The alterations at the pavilion are nearly completed, and there will be arrangements to seat 10,000 people daily. This concourse, together with the 2,000 singers and 300 instrumental performers, will give a scene like that presented in the large engraving in the announcement in our advertising columns in this issue.

The famous Eastern musical director, Professor Carl Zerrahn, will arrive in a few days and will be serenaded at 8:30 P. M. on Sunday evening, at the Palace hotel. There was a general rehearsal on Thursday evening of this week, which was largely attended and gave a forecast of what some branches of the performance will be. There will be full demonstration of the effect produced by the weaving of the magnificent in sound into the fabric of musical composition. Artillery will be fired at proper points by electrical connection, and the large city bells will be struck in tune by the same agency. The artillery will be composed of one battery from the Presidio barracks; also a company of the militia. The festival promises to produce gala days in the city. The Oakland Light Cavalry have volunteered to escort the Governors of Oregon and Nevada on arrival. On Thursday, May 30th, there will be an excursion on the Bay for the entertainment of the country singers.

The festival bids fair to give a practical demonstration of the recent advances in electrical apparatus. The final rehearsals will be connected with telephones to different parts of the city.

A monster phonograph has been telegraphed for, and there is a prospect that this wonderful machine may be made to reproduce some of the melody for the amusement and instruction of the audience.

These few hasty notes of the movements which are now being carried forward by Mr. Bugbee and his able corps of assistants will give the reader an idea that something altogether new on this coast will be produced. The telegraph is bringing news that the great musical festival at Cincinnati is proving a grand success, and a greater than this will be in San Francisco.

FOAM AND SPRAY IN HYDRAULIC WASHING.—The owner of a hydraulic claim on Scott's Bar, Siskiyou county, writes to the PRESS, complaining that the water from his nozzle, under a 460-foot pressure, comes out foaming and full of spray, and asking how the same may be remedied. The trouble probably arises from some one of the following causes: His discharge pipe may be too short, not allowing the water a chance to collect after entering it; or the pipe may not be properly "rifled," again, there may be some obstruction to the free passage of the water into the pipe. Then the size of the nozzle may be too small for the volume of water and pressure. If the diameter of the aperture is less than two inches this is most likely the source of the trouble. If "Miner" will write us describing the shape and length of his discharge pipe, how his feed is connected with his supply pipe, with size of same and diameter of nozzle, we will be better able to advise him in the premises.

A PURGATIVE SPRING IN CALIFORNIA.—In the interesting article on the Medicinal Springs of California, prepared by John S. Hittell and published in the PRESS, April 27th, it is stated that the mineral springs on this coast possess all the medicinal virtues found in the most celebrated waters of Europe, save the purgative property. From an intelligent gentleman who has extensively explored the mountains in the southern part of the State we learn that he some time since discovered a spring in that quarter which possessed mild but marked cathartic powers, the water having been amply tested in that respect. This then supplies what has been a desideratum in our mineral springs, and as such will be likely to give to this discovery a special importance.

PETER COOPER, of New York, was first a coach maker, then a cabinet maker, then a grocer, and failed in all. In his fortieth year he began making glue, and made the foundation of his fortune, now estimated at \$10,000,000.

The Tin Ores of Montana.

A correspondent, writing from Butte City, Montana, says they have in that part of the Territory a large scope of country covered with float tin ore, which, according to assays made at Denver, carries 73% of that metal, and wishes to know what grade of this ore will pay to work or ship. In a locality where labor is so dear, and the cost of transportation to market so great as in Montana, it is doubtful whether 73% tin ore would possess any commercial value. In the stannaries of Cornwall 2% ore, worth say \$15 per ton, can be mined and manipulated with profit. But there wages, even for highly trained labor, as well as fuel for smelting are extremely low, while a market is always at hand, and the somewhat complicated and costly machinery required for ore dressing, has been brought to the greatest perfection, all of which conditions are wanting in Montana, the situation there being in fact, wholly reversed. In England the assorting and dressing of the ore is performed mostly by women and children, who, through long education, become adepts at the business, their wages ranging from four pence to ten pence per day. This ore has to be freed from all foreign matter or the smelters will not buy it. The least impurity renders it difficult to smelt, the presence of quartz being especially objectionable, as it forms a silicate of tin that interferes seriously with its successful reduction. Long practice renders these cheap laborers so expert at the business, that not a particle that should be removed escapes their eye, wherefore the ore goes to the concentrator as clean as it can be made by hand. This is a difficult ore to concentrate by machinery, being often accompanied by substances as heavy as the metal itself. The smelting of this ore is simple enough if a small loss of metal be disregarded, the preceding operation of roasting requiring, however, more experience and care.

We should be glad to learn that profitable stannaries had been opened in Montana, but are not sanguine that this result will be reached until the price of labor and transportation shall be reduced, or a higher grade of tin ore found in that country. It is long since we gave up looking for any large out-put from the tin mine of Temescal, in the southern part of this State, although some specimens of extremely rich ore have been obtained there, and it was confidently expected that it would, years ago, have become a source of large wealth to the owners.

NOT ALTOGETHER NEW.—We stated in our last issue that a correspondent of the *Jeweler* had introduced a self-calculating method for assaying silver at certain smelting works, which seemed both new and useful. On referring to the "Explorers," *Miners* and *Metalurgists' Companion*, by J. S. Phillips, M. E., of this city, we find that these calculations are by his method entirely avoided both for ounces and dollars per ton, and for thousandths fine, both for gold and silver, as well as the percentage for base metals and fluxes, this subject, commencing on page 219 of that work, being extensively treated of. Mr. Phillips has, in fact, been very prolific of modes for avoiding figures, as well as comprehensive on the necessary calculations of values in his book.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Modoc, May 8th, \$4,600; Tybo Con., 6th, \$8,280.69; Manhattan, 10th, \$14,296; Standard, 7th, \$41,399.25; Northern Belle, 8th, \$2,083.26; Star, 11th, \$6,000; Modoc, 9th, \$8,181.53; Justice, 11th, \$7,116.14; Tybo Con., 10th, \$4,292.53; Modoc, 11th, \$4,195.16; Star, 14th, \$4,300; Manhattan, 14th, \$13,000; Northern Belle, 11th, \$3,138.99; California, 13th, \$11,905.09; Con. Virginia, 13th, \$71,207.51; Christy, 15th, \$4,312; Hussey, 14th, \$2,800; McCrackin, 15th, \$31,266.69.

THE MINING AND SCIENTIFIC PRESS will be represented at the Paris Exposition by Mr. Robert Grimsley, who leaves New York this week. He will gather there whatever will be of interest to the readers of the PRESS, turning his attention more particularly to improvements in the line of mechanics and mining.

An explosion took place in the coal bunkers of the steamship *Sardinia* on her way from Liverpool to Quebec, killing two of the crew and seriously wounding many of the passengers. The vessel was run ashore, scuttled and sunk in 30 feet of water. She cost \$800,000 and was uninsured. Attempts will soon be made to raise her.

THE California Pacific railroad, between Vallejo and Sacramento, upon which through travel has been interrupted for several months in consequence of the washout, will soon be in running order again, a large force of Chinese having been set to work repairing it.

THE corner stone of the shop of the engineering department being erected in the navy yard at Washington, is a mass of metal, weighing five tons, obtained by melting down counterfeit plates and dies captured by the detectives of the Treasury Department.

Japanese Porcelain.

[By C. W. GENSEL in *Dingler's Polytechnic Journal*.
Translated for the MINING AND SCIENTIFIC PRESS.]

Japan is well known for its richness in fine clay. The raw material even is so pure that it can be used to produce the justly admired porcelain ware of that country. The center of this porcelain manufacture is the city of Arita, in the province of Hizen. In a very small circle about this city are found all the necessary materials of such purity that they can be simply ground and elutriated without further mixture, and made into the finest "egg-shell porcelain." Besides this material is found in the middle parts of Nippon, where granite predominates, in the provinces of Owari, Yamshiro and on the island Awajishima opposite Hiogo, where the beds are very similar to those of Bohemia. For the preparation of porcelain this substance is mixed with siliceous and felspathic earth from other adjacent regions. These materials have but just now been prospected petrographically, and have scarcely yet been chemically examined.

I seize this opportunity to add a few contributions upon some material from the neighborhood of Arita, which I received through the kindness of the Japanese Exhibition Commissioner, Prof. Dr. Wagner, of Vienna. This substance is peculiar in possessing throughout a stony rather than an earthy appearance, and six specimens of it resemble a white or pale yellow clay stone (*Felsituff*), possess a tolerable hardness, about that of brick, is compact, not porous and apparently quite homogeneous without noticeable admixture of minerals, and only one specimen is friable, soft, and like our (the German) porcelain earth. This stone-like material we will for short call *porcelain stone* in contradistinction to porcelain earth. It consists when examined under the microscope in thin sections of a tolerably water-clear matrix which is more or less mixed with the finest dust-like particles, the minutest grains, bubbles, little needles and irregular fragments. They have no definite recognizable crystalline form, but show under polarized light the well-known play of colors, which belongs to crystalline rocks. Amorphous admixture was not observed in any noticeable quantity. On the other hand there swim in this matrix, in one sort commonly, in the rest less often, little heaps, or grain-like aggregations. These prove to be balled together of little round grains, irregularly, now long, now zigzag flocculent clouds which are opaque. Near them appear irregularly shaped particles of the matrix more uniform in composition of a yellowish hue. With the exception of the smallest water-clear, short splinters perhaps of quartz, feldspar or mica—there were no mineral separations. There were only found in most of the specimens little crystals of pyrites, which were sometimes united in little heaps, or when decomposed form yellow spots or streaks. In single specimens one notices curved cracks, and parallel stripes which call the varicose structure. The whole resembles in the most striking manner a felspathic or trachytic clay-rock, such as is found in Hungary in the trachytic districts.

This hard porcelain stone appears to be peculiar to the Japanese as well as the Chinese porcelain manufacture. The porcelain earth-like, soft earthy substances can serve only as admixtures to the other firmer varieties. This earthy mass consists of similar crystalline water-clear, and opaque particles, as well as the stone-like, only these loose fragments are not bound firmly together by a matrix. A chief constituent of this mixture seems to be silica or a silicate of alumina. For according it was impossible to remove but a minimum of the silica by boiling potash. This would all dissolve were it in the amorphous condition. This being accepted, a clay-like nature seems to show itself in my analyses. The characteristic of this substance seems its richness in silica and its small amount of water. So far as I know there is but one other chemical analysis of a Japanese clay which has been published, viz: that of Malaguti of Sevres. This appears in column A:

	A	I	II	III	IV	V	VI
Silica	73.90	70.74	77.35	83.00	80.00	79.73	49.25
Alumina	20.00	21.75	14.97	11.50	12.00	12.45	38.53
Iron oxide	—	2.02	2.11	0.70	0.50	0.67	1.14
Manganese Oxide	—	—	—	—	—	—	—
Lime	—	0.72	0.15	—	0.03	0.61	0.15
Magnesia	—	0.02	0.29	0.13	0.25	0.14	0.36
Potash	—	3.23	1.73	1.90	2.40	1.71	2.01
Soda	—	2.43	0.32	0.09	0.57	0.27	0.39
Lithium, sulphur, etc., in different materials	—	—	—	—	—	—	—
Water	—	—	1.09	—	0.60	0.38	0.65
			2.76	2.43	3.00	2.24	5.90
100.00	100.91	100.12	100.60	99.15	98.20	98.74	

- I. Good Japanese white porcelain.
 - II. Porcelain stone with distinct particles of pyrites.
 - III. Slightly yellowish porcelain stone.
 - IV. Dazzling white porcelain stone.
 - V. Porcelain stone containing pyrites.
 - VI. Dazzling white, soft, fragile porcelain earth very similar to the European, but contains considerable less water.
- In general the composition is tolerably varying, but not more than is usual. If we compare the analysis of the raw materials with that of the manufactured burned porcelain (I), it will be clear at the first glance that this latter can be made only through an admixture of the clay made by pounding and elutriating the porcelain stone with the natural soft porcelain

sarth (VI). They must mix about two parts of the first kind with one part of the latter. But in order to produce such a high percentage of alkalis there must probably have been added feldspar powder in addition, or as in China, add limo. This latter is there burnt

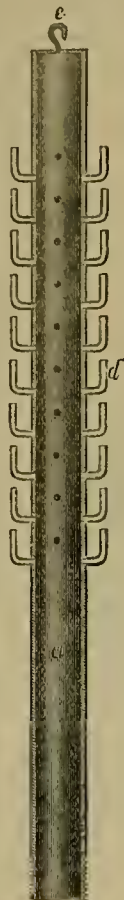


Fig. I.

FORMS OF STEAM QUIETING NOZZLES.

with the stems of ferns, probably to be able to utilize the alkali of the ash of the latter. The molded and dried porcelain is then dried in small furnaces. In fracture, the Chinese porcelain is a little reddish and glistening,

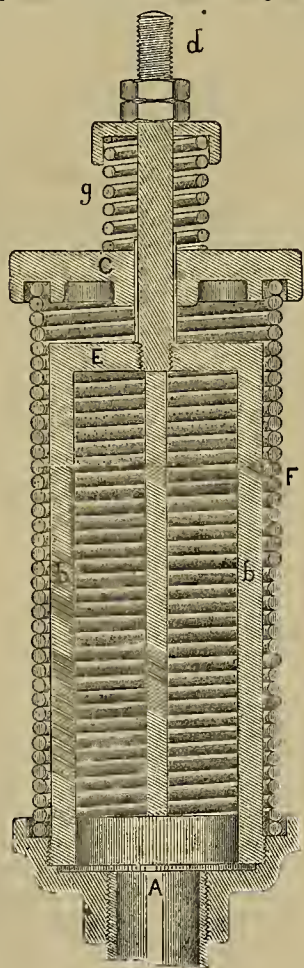


Fig. III.

while the Japanese is of a dazzling white color, and has a beautiful white glaze, this is still considerably heightened by the painted colors which are added. But this painting is mostly thin, peels off, and is consequently not very durable.

Steam Quieting Nozzles.

There are many instances unpleasantly common, when the noise of escaping steam is both annoying and prejudicial to health; and it is often a source of danger and loss.

This familiar "coughing" of locomotive exhaust-nozzles is not only a noisy nuisance, but this peculiar mode of exhaust causes instead of a full, steady and efficient draft through the grate-bars, flues and stack, a bodily lifting of large and small particles of fuel, and their dis-

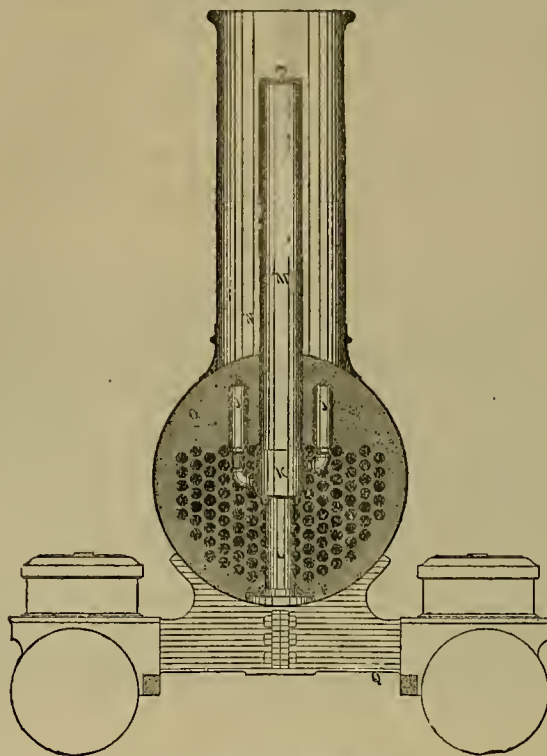
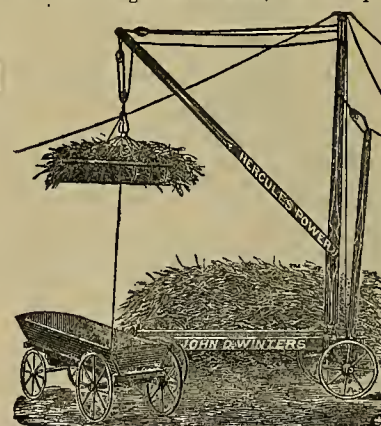


Fig. II.

charge into the open air or against a screen placed to detain them and diminish the number of road-side fires caused by their means. This waste of fuel from locomotive stacks is enormous; in some test cases being shown to be about one-third of a ton of coal per day per engine. The sparks and cinders besides causing damage by fire, occasion lesser annoyances; such as pain or injury to sight of passengers and the cutting of the paint of cars. A marked disadvantage of the present arrangement is that in reversing, cinders are apt to be drawn into the cylinders, then causing damage. The sharp-shooting sound of the exhaust frightens green and mettlesome horses, causing accidents in the country and forcing railroad companies to employ long and blocking teams of horses for draft of freight cars in cities, and also pre-



WINTERS' IMPROVED DERRICK.

venting the employment of steam on our city railways. The noise of escaping steam is always a nuisance, whether from a locomotive, steamer, or ordinary engine.

Mr. Thomas Shaw, of Philadelphia, (well known for his "gun-powder-pile-driver," differential pressure gauge, dead stroke hammer, etc.,) has devised two modes of quieting escaping steam. It is an exhaust nozzle for locomotives and is shown in figure 1 of the accompanying engraving. It is the form used in stacks of contracted area, and is a simple, straight tube closed above, and having a number of smaller ones bent at right angles and screwed into it as outlets.

Fig. 2 shows a locomotive with increased diameter of stack, and longer smoke-arch, and having a larger cushion-pipe, M, with an expansion chamber, K, from which branch off a number of exhaust nozzles, J.

The spiral device is shown in vertical lengthwise section in Fig. 3, as made for exhaust nozzles, safety valves, brake discharge pipes, etc.

A is the base bearing bars, b b, supporting a coil of wire of such diameter and length that, when compressed nearly to contact, the spaces between the turns of the coil will have a total area much larger than that of the steam escape pipe. The upper tightening spring, g, enables the coil to be kept at the proper tension.

The rushing steam lifts the cap plate, c, opening the coils which receive all the vibrations, but by touching against each other completely neutralize them.

The device is claimed to be effective in quieting the noisiest safety-valves, and this opinion is well endorsed by those competent to judge, and by reports based on actual working.

An Improved Unloading and Stacking Derrick.

An engraving on this page represents an improved unloading and stacking derrick, recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by John D. Winters, of Grand Island, Colusa county. This device may be used in the process of heading and threshing and for stacking hay and straw. With it wagons may be unloaded at the rate of one per minute. The derrick can be taken down and put up again in a few minutes, and it will unload and stack from two 16-foot headers at the same time.

The netting is made in two parts. On one of the parts the ropes of which the netting is made extend beyond the rail which is nearest the point where the two parts of the netting are to be connected. Each two adjoining rope extensions are connected together at their ends and a ring attached at their point of friction. This gives a number of rope extensions outside of the rail, all of which are of equal length and each having a ring attached to it.

The rail of one part of the netting is provided with an equal number of straight pins, which project at right angles from the face of the rail. This rail is also provided with a short arm at its middle, which also projects at right angles, and to the end of this arm is attached a link, chain or rope. In the middle of the next adjoining rail is a detaching apparatus, operated by a cord. To connect the two parts of the netting together in order to receive a load, the rings are placed over the pins in regular order. The rail is then turned around, so that the rings will draw against the face of the rail. The link or chain is then connected with the detaching device and the netting is ready for use. The pins will then hold the rings against any strain that the parts will withstand. To disconnect the two parts and dump the load, a slight jerk upon the string or cord attached to the detaching apparatus will allow the parts to separate and drop the load. This arrangement is extremely simple and strong. It avoids the necessity of using a spring or other device of doubtful strength or action.

The derrick is mounted on a wagon as shown and has a suitable device by which it can be raised from a horizontal to a vertical position upon the wagon. A cross-bar placed over the front axle sustains the derrick, with the usual swivel secured on the base bar that is held by journals or boxes or ring-bolts, on which the derrick swings when upright.

The forward end of the frame work projects as far as practicable and sustains a cross-bar having a jack frame hinged to it in any suitable manner so that it can also be raised or lowered. At the top of the frame a rope passes over a pulley and is fastened near the upper end of the derrick.

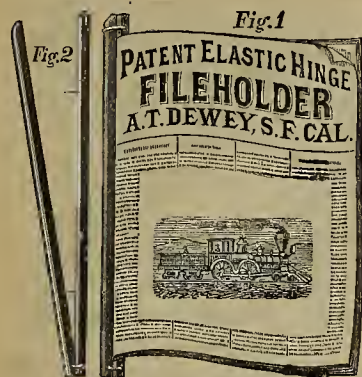
When transporting the machine from place to place the derrick and jack frame are lowered to a horizontal position; but when it is desired to use the derrick the jack frame is first raised by hand and secured in a vertical position as shown in the engraving. The derrick is then raised by means of the rope passing through the pulley block at the top of the jack frame, and secured in any suitable manner.

The arrangement is very simple and admits of the derrick being conveniently carried on the wagon and raised quickly and easily to a vertical position when desired.

By combining the two inventions of Mr. Winters a very useful arrangement for unloading wagons, etc., is formed, as any farmer can see at a glance. John Morgan, Davisville, Yolo county, is manufacturer, and may be addressed for further information.

MONTANA FAIR.—We have received a neat pamphlet containing the premium list, etc., of the ninth annual fair of the Montana Agricultural, Mineral and Mechanical Association, which will be held at Helena, beginning Monday, September 23d, and continue six days. The officers of the association are: President, W. A. Chessman; Vice-President, S. H. Crouse; Treasurer, T. H. Kleinschmidt; Secretary, C. G. Reynolds; Directors, J. F. Taylor, W. A. Chessman, S. C. Ashby, W. G. Prentiss, T. H. Kleinschmidt, Timothy Wilcox, A. J. Davidson, S. H. Crouse, Francis Pope. The premiums are liberal in all classes of exhibits, and the fair will doubtless be a successful one.

A STEADY DECLINE.—The gold production in Victoria, Australia, has been steadily decreasing ever since 1866, when the yield amounted to 1,536,581 ounces and the number of miners was 73,749; diminished to 792,839 ounces in 1877 with but 33,882 miners,



Among the advantages gained by this holder are the following:

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OUR AGENTS.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. L. THARP—San Francisco.
B. W. CROWLEY—California.

A. C. KNOX—Pacific Coast.
C. N. WEST—Santa Cruz, Monterey and San Benito counties.

A. C. CHAMPTION—Tulare, Fresno and Inyo counties.
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H. E. HALLITT—Marin County.
G. W. MCGREW—Santa Clara County.

WM. M. BREWER—Black Hills, Dakota Territory.
RICHARD ALLEN—British Columbia.

EVERY new subscriber who does not receive the paper and every old subscriber not credited on the label within two weeks after paying for this paper, should write personally to the publishers without delay, to secure proper credit. This is necessary to protect us and subscribers against the acts and mistakes of others.

TESTING AND WORKING SILVER ORES.—This is the title of an illustrated work of 114 pages, for Miners and Prospectors, by Chas. H. Aaron, published by Dewey & Co. It is written for miners, in plain language, and with all necessary details in description. The author describes the different processes of roasting ores, the appliances, methods of testing ores, testing for a process, working samples, treatment of base metals, use of chemicals, leaching processes, different kinds of crushing apparatus, etc. This little work abounds with useful hints to miners and prospectors, and is written in a practical style. Price, post free, \$2.00. Address, Dewey & Co., MINING AND SCIENTIFIC PRESS, 222 Sansome St., San Francisco.

SETTLERS and others wishing good farming lands for sure crops, are referred to Mr. Edward Frisbie, of Anderson, Shasta County, Cal., who has some 15,000 acres for sale in the Upper Sacramento Valley. His advertisement appears from time to time in this paper.

KUSTEL'S CONCENTRATION OF ORES (of all kinds), including the Chlorination Process for Gold-bearing Sulphurets, Arseniurets, and Gold and Silver ores generally, with 120 Lithographic Diagrams, 1867. The most complete treatise. Published at this office. Price, \$7.50. Postage, 50 cents extra.

MINING AND SCIENTIFIC PRESS. \$4 a year. Published weekly at San Francisco, Cal. Our western friends will find this the most readable of papers, it being filled with full of good things. We are always anxious to read each number.—*Indianapolis Mechanical Journal.*

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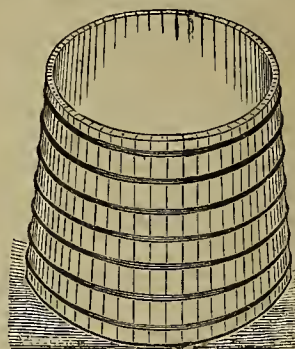
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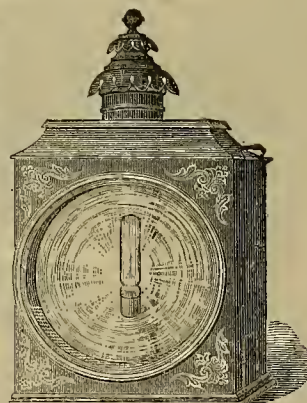
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PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING, APRIL 30TH.

WASHING MACHINES.—William Haas, Walla Walla, Wash. Ter.

TRADE-MARKS.

SMOKING TOBACCO.—Girolamo Suich, S. F.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

News in Brief.

THERE were 89 deaths in the city last week. J. G. FAIR, of the bonanza firm, is again sick at Virginia City.

LOS ANGELES is making large exportations of corn to Mexico.

EIGHTY THOUSAND persons visited the Paris Exposition on Sunday.

THE "bell punch" liquor bill is likely to become a law in New York.

TOBACCO smoking has doubled in Great Britain during the last 30 years.

DIPHTHERIA has been prevalent at Middletown, Lake county.

SINCE the settlement of Lake county there has never been a failure of crops.

AS THE prospects for peace improve the prices of wheat decline in the English market.

ON the 12th of May it snowed steadily all day in the Black Hills region.

JOSEPH F. DEMANS, 12 years old, was drowned in Bear creek, Merced county, May 9th.

PROF. JOSEPH HENRY, for many years head of the Smithsonian Institute, is dead.

AS the game laws of this State are now in full force, the sporting fraternity should beware.

GOVERNOR EMORY of Utah predicts that female extravagance will eventually kill Mormonism.

THE earthquake at Maniziles, South America, did considerable damage to houses, but no lives were lost.

THE value of Peter's pence and other offerings made to Pius IX. amounted to no less than \$95,000,000 in all.

EIGHT car loads of wine have just been shipped from King's cellar, in St. Helena, Napa county, to St. Louis.

A NATIONAL convention will meet in London and protest should the English government determine to go to war.

CHARLES E. LEE, who had just arrived in the Black Hills, was found murdered and robbed, near Deadwood, on the 12th inst.

THE wages of operatives in the New England factories are being generally cut down about four per cent., on account of the hard times.

THE customs officers at Havre will not permit arms from the United States for the Russian government to be landed.

D. SHEPARDSON, tried last week for the murder of Arnold, City Marshal of Colusa, has been acquitted.

LUX AND MILLER are said to own about 700,000 acres of land in this State, on which they pasture 50,000 head of cattle.

"COBURN GEORGE," an Indian celebrity residing near Truckee, was run over and killed by a Central Pacific train the other day. He was drunk at the time.

CARMELLO is the name of a new town just laid out at the whaling station on Carmello bay, near Monterey. A glass factory is the first proposed enterprise.

THE members of the San Francisco Police force have been notified that from this time henceforth they will not be permitted to smoke pipes, cigars, or cigarettes while on duty.

OUR army of 25,000 men costs nearly \$26,000,000 a year, the English army of 133,720 costs but \$63,219,500; the latter being a yearly cost of \$473 per man and ours \$1,050.

At a walking match in New York the other day A. Harrison, of Haverhill, Massachusetts, made 160 miles in 34 hours, 29 minutes, and was awarded the first prize.

THE Free Labor Exchange last week furnished employment to 114 persons, of whom 91 were men, and 23 women and girls. Of the men, nearly half went into the country.

At Victoria, B. C., no public house is allowed to remain open on election days, neither can liquor be sold or given away, under heavy penalties.

REV. HENRY WARD BEECHER will arrive in this city about the 10th of August, his object being to lecture here and in other cities on this coast.

CHARLES MORGAN, owner of a steamship line between New York and New Orleans, with steamers in the Texas trade—21 in all—died last week, worth \$13,000,000.

THE Alaska waters contain more salmon than all the other waters in the known world. Within a few years salmon canneries will be established along the Alaska coast. Already the Pioneer cannery of Alaska has been located at Klawak, on Prince of Wales Island.

GEN. GRANT, wife and son are in Paris. GORTCHAKOFF is weaker in consequence of a fresh attack of gout.

THE 342,595 pensioners on the pension lists will this year cost our Government \$29,371,537. MORE parties, claiming to be relatives of the late A. T. Stewart, are suing for a portion of his estate.

THOMAS DREW, a native of England aged 69, dropped dead while raking hay on his ranch in Santa Cruz county, May 2d.

STANLEY, the African explorer, was, it is said, born a little over 30 years ago in a Welsh poorhouse.

THERE was a heavy snow-storm at Muscatine, Iowa on the 11th of May, with frosts in Ohio and Indiana, but no serious harm done.

EXTENSIVE strikes followed by lockouts, riots and suffering have occurred among the spinners and weavers in England and Scotland.

FRANK DUSY has sheared this spring at his corral at Fresno 43,000 head of sheep, and Foster & Morrow about 50,000 head.

A STEAMSHIP line under the auspices of China and Peru has been opened between Hongkong and Callao to facilitate Chinese emigration to Peru.

JOHN A. McDONALD, who has been a member of the Legislature, of a State convention, Presidential Elector, etc., is now at work in Raleigh, N. C., as a common laborer, equally respected as when he held office.

HEAVY failures have occurred in Liverpool, and it is feared many more will soon follow owing to the great depression in most branches of trade.

THE chair factory at Forestville, Sonoma county, is now running out 100 chaires per day, mostly of the old-fashioned style with rawhide bottoms.

ON the 11th inst. Emperor William, while returning from a drive, was fired upon but escaped unhurt. The assassin was arrested after firing two shots, both balls lodging in the Emperor's carriage.

IT is announced that all white men who desire work may obtain it by applying to the Central Pacific Railroad Company, who are in need of workmen to repair the break on the California Pacific.

PROF. MARTIN made another balloon ascension from Woodward's Gardens last Sunday. After being up an hour and a quarter, and reaching a height of 5,000 feet, he landed safely in Alameda.

THE rainfall the present season has been at Shasta 95 inches, while at Bakersfield it has been but eight inches, the former being about the wettest and the latter the driest locality in the State.

THE Supreme Court of Massachusetts has decided that a note given for a church subscription does not carry with it an obligation to pay, since it is given without consideration.

NO TROUBLE with Sitting Bull is anticipated within the limits of the department, but General Crook to be prepared is sending scouting expeditions north and northwest of the Black Hills.

REPORTS from 29 States and one Territory indicate the largest crops of all kinds this season ever had in the history of the country. The increased acreage of wheat in the Western States is very large.

IT is believed the Jesuits and violent party have triumphed at the Vatican, which, it is said, has resolved on a policy of resistance, all negotiations with Prussia and the other powers having failed.

THERE is a rumor that secret negotiations have been for some time on foot for the enlistment of a corps of five or six thousand Irish soldiers to be sent to Russia for service against England.

IN his report on the proper terminus for the Canada Overland Railway, Admiral De Horsey, of British Columbia condemns Burrard Inlet and Skeena river as harbors, and strongly favors the adoption of the Bute Inlet route, with Esquimalt as the terminus.

WM. CARTER shot and instantly killed Jesse Hankin, his son-in-law, near St. Helena, Napa county, not long since. Hankin's wife left him shortly after being married and returned to her father's, which caused bad blood between the parties.

THE funeral of John Morrissey took place from St. Peter's Catholic Church, at Troy, N. Y., and was attended by an immense concourse. The entire State Senate, with Lieutenant-Governor Dorsheimer and a delegation of Assemblymen, were present. Bishop McNierny, of Albany, assisted at the religious services.

Signal Service Meteorological Report.

Week Ending May 15, 1878.

HIGHEST AND LOWEST BAROMETER.							
May 8	May 9	May 10	May 11	May 12	May 13	May 14	
30.05	30.04	30.04	30.09	30.03	29.99	30.02	
30.03	29.99	30.00	30.05	29.99	29.93	29.96	
MINIMUM AND MAXIMUM THERMOMETER.							
01	60	60	64	62	59	62	
53	51	51	54	51	50	52	
MEAN DAILY HUMIDITY.							
63	73	79	80	75	72	74	
PREVAILING WIND.							
W	W	W	W	W	W	W	
WIND—MILES TRAVELED.							
157	244	223	227	303	333	403	
STATE OF WEATHER.							
Fair.	Fair.	Fair.	Fair.	Clear.	Clear.	Clear.	
RAINFALL IN TWENTY-FOUR HOURS.							
.	.	.	.	.	.	.	
Total rain during the season, from July 1, 1877, 35.91 in.							

Photographic Improvement.

Mr. I. W. Taber, one of the best favorably known photographers in San Francisco, contemplates a new departure from his present rooms, No. 22-26 Montgomery St. His new enterprise is spoken of by an exchange as follows: We are reliably informed that I. W. Taber, the well-known photographer of this city, has secured a three years' lease of the upper portion of the new Hibernia Bank building, to be erected on the corner of Montgomery and Post streets. This building, when completed, will be one of the most imposing in this city, and we congratulate Mr. Taber on his foresight and energy in securing, in the face of a strong competition, what must be considered the very best location in San Francisco for a first-class photographic gallery. The Hibernia Bank managers intend to arrange the entire upper portion of their new building, 60x90 feet, for the purpose named. From the plans shown us, this gallery will be the most complete and best arranged of any in the country, and we doubt if it will have its superior in the world. The main entrance, eight feet wide, will be on Montgomery street, which, leading to a large elevator, it will lift the visitor directly into the "Taber Photographic Parlors" on the third floor, which will consist of a large general reception room, three private parlors, three retiring rooms, store room and laboratory, two studios for artists, business office, etc. From this floor a broad stairway will lead to a second operating room of glass above, which will be provided with all the latest improved instruments for taking the most elaborate and perfect pictures known to the art. Telephone communication will be made with the Palace, Grand, Lick, Cosmopolitan, Occidental, and possibly the Baldwin Hotels—all of which, excepting the latter, are within a block of the proposed building—for the purpose of allowing the inmates therein to communicate directly with Mr. Taber, and make appointments for a sitting, etc. This alone will be a novelty and convenience to the ladies, who can arrange their toilets at their respective hotels, and secure a picture without being compelled to wait any length of time at the gallery. Mr. Taber is now having made in this city instruments for taking pictures by electricity. These, in connection with Mr. Taber's great skill, taste and courteous deportment, combined with the location and appointments of his gallery, are sure to make it the most attractive institution of the kind in the city. The building will be ready for occupancy about the 1st of July. In the meantime Mr. Taber contemplates a trip East and to Europe for the purpose of securing an entire new outfit for his business, comprising all the latest and most improved instruments that can be obtained. It is contemplated that \$15,000 will be expended in fitting up this establishment. We believe that Mr. Taber is the only photographer in California that contemplates competing with the European galleries at the coming Paris Exposition. Mr. Taber has introduced on this coast many new and beautiful ideas in the photographic line, of which we remember the "Promenade," Pictorials, Chromatics, Spherical, Statuette, Rustic, Marine, Equestrian, etc.; and his success in securing satisfactory pictures of children cannot be disputed. The rooms will be so arranged that several can be thrown into one for large pictures in groups, for the taking of which Mr. Taber is justly noted.

We can speak personally in favor of the excellencies and perfections of Mr. Taber's photography. He has invented and patented more improvements than any other photographer on this coast during the past ten years.

Woodward's Gardens were never more attractive than at present. A fine lion and two lionesses, all young and not fully grown, have just been added. Balloon ascensions by Prof. Martin are now being made. The popularity of the gardens continues to increase. Rates of admission unchanged.

ANY person receiving this paper after giving an order to stop it, may know that such order has failed to reach us, or that the paper is continued inadvertently, and they are earnestly requested to send written notice direct to us. We aim to stop the paper promptly when it is ordered discontinued.

MR. W. J. WOOLLEY, who took out a Canadian Patent some four years ago, is requested to call at the MINING AND SCIENTIFIC PRESS PATENT AGENCY OFFICE. Business of importance.

AYER & SON'S MANUAL contains information of much value to advertisers; sent free. Address N. W. Ayer & Son, Advertising Agents, Times' Building, Philadelphia.

ANY PHOTOGRAPHER having a large Camera Box for sale will please notify "N. S." at this office.

MODEL MAKER AND MACHINIST.—I. A. Heald, No 514 commercial St., San Francisco, (fourth floor).

METALS.

[WHOLESALE.]

WEDNESDAY, M., May 15, 1878.

Iron—		
American Pig, ton.....	28 00	@ 30 00
Scotch Pig, ton.....	28 00	@ 30 00
White Pig, ton.....	28 00	@ —
Oregon Pig, ton.....	28 00	@ —
Reinforced Bar.....	24 00	@ 34
Horse Shoes, keg.....	5 00	@ 7 1/2
Nail Rod.....	—	@ 7 1/2
Norway, Oval.....	—	@ 7 1/2
COPPER—		
Sheathing, lb.....	34 00	@ 35
Sheathing, Yellow.....	21 00	@ —
Sheathing, Old Yellow.....	12 00	@ —
Composition Nails.....	24 00	@ —
Composition Bolts.....	24 00	@ —
STEEL—		
English Cast, lb.....	13 00	@ 14
Anderson & Woods, ordinary sizes.....	15 00	@ —
Drill.....	15 00	@ —
Flat Bar.....	14 00	@ 13
Plow Steel.....	11 00	@ 12 1/2
TIN PLATES—		
10x14 I C Charcoal.....	7 50	@ 8 50
Barren Tin.....	23 00	@ 24
Australian.....	17 00	@ 17 1/2
ZINC—		
By the Cask.....	9 00	@ —
Zinc, Sheet 7x3 ft, 7 to 10, lb.....	9 00	@ 10
7x3 ft, 11 to 14.....	10 00	@ —
8x4 ft, 8 to 10.....	11 00	@ —
8x4 ft, 11 to 10.....	11 00	@ —
NAILS—		
Assorted sizes.....	3 15	@ 25
QUICKSILVER—		
By the lb.....	43 00	@ 45

LEATHER.

[WHOLESALE.]

WEDNESDAY M., May 15, 1878.

Solo Leather, heavy, lb.....	22 00	@ 23
Light.....	20 00	@ 24
Jodok, 8 Kil, doz.....	48 00	@ 50 00
11 to 13 Kil.....	55 00	@ 60 00
14 to 19 Kil.....	80 00	@ 90 00
Second Choice, 11 to 16 Kil.....	55 00	@ 70 00
Cornellian, 12 to 18 Kil.....	67 00	@ 67 00
Females, 12 to 18 Kil.....	63 00	@ 67 00
14 to 16 Kil.....	71 00	@ 70 00
Simon Ulmo, Females, 12 to 13 Kil.....	58 00	@ 62 50
14 to 15 Kil.....	68 00	@ 70 00
16 to 17 Kil.....	72 00	@ 74 00
Simon, 18 Kil.....	60 00	@ 65 00
20 Kil.....	65 00	@ 67 00
24 Kil.....	72 00	@ 74 00
Robert Calf, 7 and 9 Kil.....	35 00	@ 40 00
Kips, French, lb.....	1 00	@ 1 35
Cal, doz.....	40 00	@ 60 00
French Sheep, all colors.....	8 00	@ 15 00
Eastern Calf for Backs, lb.....	1 00	@ 1 25
Sheep Roans for Topping, all colors, doz.....	9 00	@ 13 00
For Linings.....	5 50	@ 10 50
Cal, Russian Sheep Linings.....	75 00	@ 4 50
Boot Lega, French Calf, pair.....	4 00	@ 2 —
Good French Calf.....	4 00	@ 4 75
Best Jodok Calf.....	5 00	@ 5 25
Leather, Harness, lb.....	5 00	@ 5 25
Cal, doz.....	48 00	@ 67 00
Skirting, lb.....	33 00	@ 37
Welt, doz.....	30 00	@ 50 00
Buff, ft.....	18 00	@ 20
Wax Side.....	17 00	@ 18

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, May 15, 3 P. M.

LEOAL TENDERS IN S. F., 11 A. M., 99 1/2 @ 99 3/4. SILVER, 2 1/2 @ 1 1/2. GOLD IN NEW YORK, 100 1/2. GOLD BARS, 890 @ 910. SILVER BARS, 82 1/2 @ 84 cent. discount. EXCHANGE on New York 1/2; on London bankers, 49 @ 49 1/2. Commercial, 50; Paris, 1/2 francs @ dollar; Mexican dollars, 94 1/2. LONDON Consols 95 11-16; Bonds, 105 1/2. QUICKSILVER IN S. F., by the Hask, @ lb, 45 @ 47 1/2.

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HULL & BELDEN CO'S VISES AND WRENCHES,
HOBART'S TACKS AND NAILS,
MYERS & CO'S SHOVELS AND SPADES,
MONITOR LAWN MOWERS,
TUTTLE MFG. CO'S FORKS, HOES AND RAKES,
NOVA SCOTIA STONE CO'S GRINDSTONES,
ROGERS CUTLERY CO'S PLATED WARE,
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WOOLWORTH'S AXE, PICK AND TOOL HANDLES.

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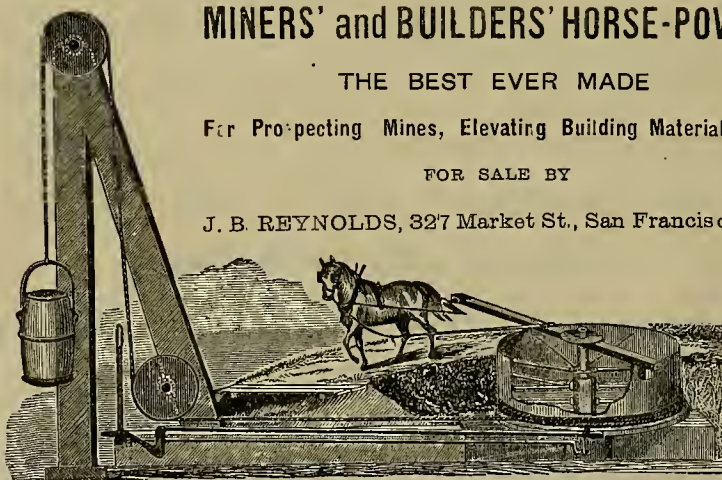
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To Mining Secretaries.

An amendment to Section 336 of the California Code,
taking effect July 1st, 1874, provides that in addition
to the regular publication, daily or weekly, of the assess-
ment and sale notices as heretofore,

PERSONAL NOTICE

Must be served as provided in the following quotation
from the law:

"The notice must be personally served upon each
stockholder, or in lieu of personal service, must be set
through the mail, addressed to each stockholder at his
place of residence, if known, and if not known, at the
place where he principal office of the Corporation is sit-
uated."

The above refers to the ASSESSMENT NOTICE only.
Advertisers in the MINING AND SCIENTIFIC PRESS
will be furnished with copies of assessment notices printed
on slips suitable for serving personal notice under this
law at short notice.

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Mining and Other Companies.

Persons interested in incorporated share
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of the official notices of their companies
in this paper, as the cheapest appropriate
medium for the same.

California Fruit Growing Association.—
Principal place of business, San Francisco. Location of
property, El Dorado County, Cal.

Notice is hereby given, that at a meeting of the Board of
Directors, held on the third day of May, 1878, an assessment
(No. 3), of three (\$3) dollars per share was levied upon the
capital stock of the corporation, payable immediately in U.
S. gold coin, to the Secretary, at the office of the Com-
pany, 641 Sacramento Street, San Francisco, Cal.
Any stock upon which this assessment shall remain unpaid
on the eighth day of June, 1878, will be delinquent
and advertised for sale at public auction, and unless pay-
ment is made before, will be sold on Saturday, the twenty-
ninth day of June, 1878, to pay the delinquent assessment,
together with costs of advertising and expenses of sale.

D. A. BROWN, Secy.
Office, 641 Sacramento Street, San Francisco, Cal.

Cherokee Flat Blue Gravel Company.—

Location of principal place of business, San Francisco,
Cal. Location of works, Cherokee Flat, Butte County, Cal.
Notice is hereby given, that at a meeting of the Board of
Directors, held on the seventh (7) day of April, A. D.,
1878, an assessment, No. 33, of five cents per share was levied
upon the capital stock of the corporation, payable immedi-
ately in United States Gold coin, to the Secretary, at the
office of the Company, Room 6, No. 318 Pine Street, San
Francisco, Cal.

Any stock upon which this assessment shall remain unpaid
on the twenty-seventh (27) day of May, A. D., 1878, will be
delinquent, and advertised for sale at public auction, and
unless payment is made before, will be sold on Tuesday, the
eighteenth (18) day of June, A. D., 1878, to pay the delin-
quent assessment, together with costs of advertising and ex-
penses of sale. By order of the Board of Directors.

J. W. CLARK, Secy.
Office, Room 6, No. 318 Pine St., San Francisco, Cal.

Excelsior Silver Mining Company.—Lo-

cation of principal place of business, San Francisco, Cal-
ifornia. Location of works, Potosi District, Lincoln
County, Nevada.

Notice is hereby given, that at a meeting of the Board of
Directors, held on the twelfth day of April, 1878, an as-
sessment of twenty-five cents per share was levied upon the
capital stock of the corporation, payable immediately in U.
S. gold and silver coin, to the Secretary, at the office of the
Company, 304 Post Street, San Francisco, California.

Any stock upon which this assessment shall remain un-
paid on the twenty-third day of May, 1878, will be delinquent
and advertised for sale at public auction, and unless pay-
ment is made before, will be sold on Monday, the tenth day
of June, 1878, to pay the delinquent assessment, together
with costs of advertising and expenses of sale.

FRANCIS P. DEVINE, Secy.
Office, 304 Post Street, San Francisco, California.

S. M. Mining Company.—Location of

principal place of business, San Francisco, California.
Location of works, Mineral Point Mining District, Plumas
County, California.

Notice is hereby given, that at a meeting of the Board of
Directors, held on the third day of May, A. D.,
1878, an assessment (No. 3), of five cents per share was
levied upon the capital stock of the corporation, payable
immediately in United States gold coin, to the Secretary,
at the office of said Company, Room 6, No. 318 Pine Street,
San Francisco, California.

Any stock upon which this assessment shall remain unpaid
on the eighteenth day of June, A. D., 1878, will be delinquent,
and advertised for sale at public auction, and unless payment is
made before, will be sold on the Monday, fifteenth day
of July, A. D., 1878, to pay the delinquent assessment, to-
gether with costs of advertising and expenses of sale. By order
of the Board of Directors.

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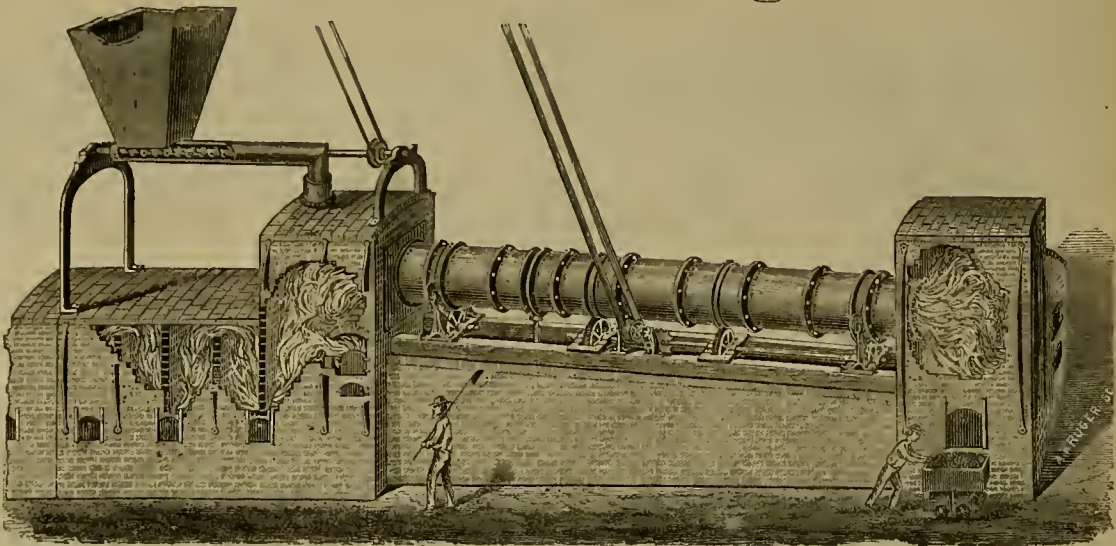
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The oft-repeated story of rival makers claiming to have been Steinways' foreman, etc.,

should have no weight with purchasers. An immense manufacturing business like the Steinway is divided into departments for the various classes of work, and a foreman of one department superintends that alone, and cannot be perfected in other details.

The Steinways (a numerous family) are the inventors and designers of the principles of their pianos, and are alone responsible for the thorough execution of their own ideas.

In the Machinery Department at the late Centennial Exhibition, Steinways were awarded a special medal for an invention for testing their iron frames under a pressure of 5,000 pounds to the square centimeter. (This award was distinct from their medal for the best pianos exhibited.) The iron frames in Steinway pianos are the only ones so tested, and while other makers rely on castings from an ordinary foundry, the Steinways maintain their own foundry, and manufacture a frame of composite metal, which adds greatly to the resonant qualities of the instrument in general.

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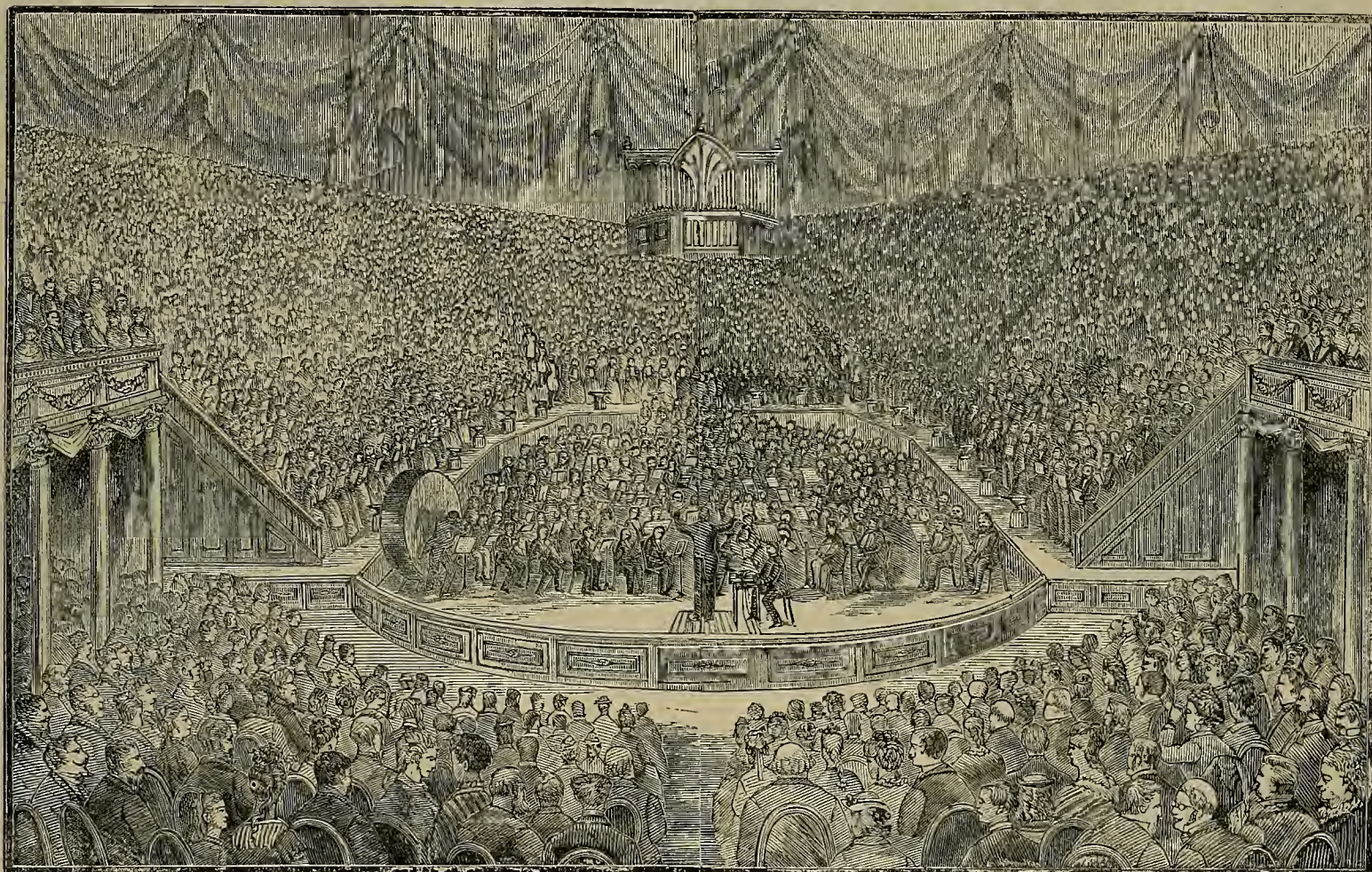
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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Patent Solicitors.

SAN FRANCISCO, SATURDAY, MAY 25, 1878.

VOLUME XXXVI.
Number 21.

The Pictet System for Manufacturing Artificial Ice.

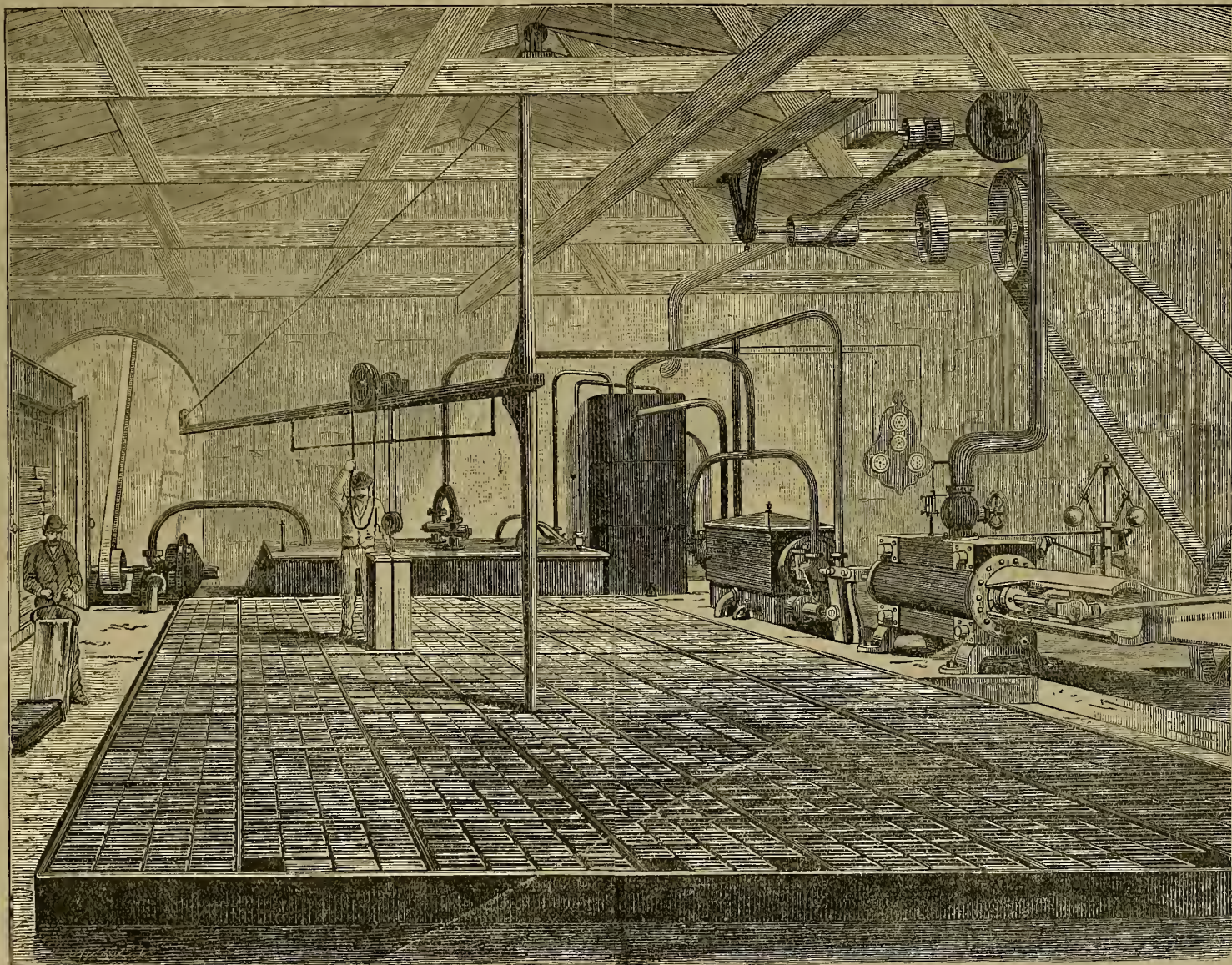
The general use of ice for domestic, manufacturing and other purposes, dates from the early part of the present century; the immense extent to which this trade has grown, is well illustrated by the average consumption of New York and Brooklyn, which is about 300,000 tons per year, the yearly increase being estimated at about 70,000 tons. This increase is not so much

although just there, it would be of so much more use and benefit.

These difficulties have caused numerous inventors to turn their attention towards the manufacture of ice by artificial means, and a great many different machines have been brought out. The making of ice by freezing mixtures has long been known, and has found extensive application in the laboratory, and used also for freezing ice-cream, etc. These mixtures are formed of certain bodies, whose chemical combination produces cold; such as salt and pounded ice or snow, nitrate or muri-

What intense cold can be thus produced, is well illustrated by the familiar experiment of freezing water or mercury in a red-hot crucible; which is effected by the expansion of liquified sulphurous acid, or of solidified carbonic acid, over which ether has been poured. These substances, in evaporating, absorb heat so rapidly that even the red-hot crucible cannot supply it quickly enough, (especially as it is separated from the substances by their vapor, which is a bad conductor), and thus the heat of the water or mercury is absorbed, causing them to freeze. The volatile liquids now mostly used in ice ma-

escapes through joints, but even penetrates cast-iron three-fourths of an inch thick; the solution has thus to be constantly renewed, which is rather expensive. The danger of explosion also increases with the pressure, and accidents from this cause have often occurred. Another source of danger is the deposit in the boiler over the fire, causing the plates to burn, and finally leading to explosion, if not constantly watched. The ammonia machine needs a great many vessels, and an innumerable amount of pipes, coils, valves, etc., making it altogether a very costly and complicated affair.



MACHINERY FOR THE MANUFACTURE OF ARTIFICIAL ICE BY THE PICTET SYSTEM

due to domestic consumption as to the requirements of manufacture, etc. Brewers, soap and candle factories, etc., use immense quantities, and the transport of meat and fruit over long distances, that has recently been inaugurated, has created an additional demand. In gathering natural ice for commerce, there are not only great expenses in cutting and storing it, erecting immense ice-houses, specially constructed for the purpose, and transporting it by rail or water to its place of consumption, etc.; but a great amount of waste takes place, which, even for a moderate climate like New York, is estimated at one-third of a crop. In Southern countries this waste is of course vastly increased, and this added to the greater cost of transportation, makes it an expensive luxury,

ate of ammonia with water, nitrate of potassium, etc.

Elastic liquids, when compressed, are highly heated, and if they are then cooled to their former temperature, and permitted to expand, the amount of cold produced by rarefaction will be equal to the amount of heat generated by compression. On this principle ice machines are worked by compressed air, but as they have not been a success to any extent, it is hardly necessary to say anything more about them. The most effective way to obtain a great amount of cold, is by the rapid expansion of a liquified gas when the pressure is removed from it, or the evaporation of a highly volatile liquid, especially when mechanical means are used to hasten the volatilization.

chines are ammonia, sulphuric ether and sulphurous acid. Ammonia was first applied by Mr. Carre, who introduced a saturated solution of ammonia into a boiler, volatilizing it under strong pressure, by heating it to 284°-302° Fahr. The vapor flows into a tubular condenser, washed by a current of water, which carries off the heat when the vapor is liquified by pressure. The liquid ammonia flows into the refrigerator, where it evaporates, producing intense cold; it is then conducted back to a vessel where it is absorbed by water, and again goes through the same process. To liquify the ammonia, a pressure must be employed corresponding to the tension of the vapor at the temperature of the condenser.

Under such great tensions, the gas not only

Somewhat simpler are the machines using sulphuric ether, which have lately come into prominence in England. The ether evaporates in a tubular refrigerator, imparting cold to an uncoagulable liquid (brine) which circulates around and through it. This liquid is then introduced into a tank containing a great number of boxes, and freezes the water in the latter. The ether vapor is drawn up by a pump, which compresses it into a condenser, where its heat is abstracted by water circulating around it and through its tubes. The ether liquified by combination of pressure and cooling, is then led by a small pipe back to the refrigerator, evaporates again, and is thus used over and over.

Continued on Page 326.

A Forward Step in Astronomy.

[A Paper by PROF. GEO. DAVIDSON, read before the California Academy of Sciences.]

There has been a recent movement to change the location of the U. S. Naval Observatory, at Washington, to one more favorable to the health of observers, and also for obtaining better conditions for observing.

It is doubtful if 20 hours of good seeing with the 26-inch refractor and moderate power can be had per annum; for the first year a power of only 600 could be fairly used upon a few occasions.

This recent movement has therefore prompted astronomers to discuss the proposition on broad grounds, so as to utilize the instruments already constructed. Admiral Rogers, Superintendent of the U. S. Naval Observatory, has expressed his convictions upon the subject, and in reply to his inquiries we condense the expressions of astronomers accompanying his letter in Misc. Doc., No. 25, Senate, 45th Congress, second session.

Prof. Hall says that the testimony of all astronomers who have really made observations at altitudes of 5,000 or 6,000 feet uniformly favor elevated positions for astronomical work.

He shows the relative practical gain in brightness of celestial objects, and says that should there be a corresponding gain in the steadiness of the images the advantages of an elevated position for astronomical observations of faint objects like nebulae, and for the work of stellar astronomy, would be very great. And he concludes by expressing his opinion that by establishing a telescope on the lofty plains of the West we have a simple and easy means of making a forward step in practical astronomy.

We have no doubt that had Prof. Hall been posted with his telescope where it was originally intended to locate the Lick Observatory, that he would have observed the satellites of Mars with much greater precision and certainty; or that a telescope of from six to eight inches objective, so located, would have seen them.

Prof. Harkness says that the question whether extreme steadiness and purity of atmosphere can be best obtained on an elevated plateau, is yet open, but that, if the advantages should be proved, then it may be well to have the serious disadvantages of location far from a large city, etc.

Even granting these disadvantages he does not think the work should be for precision especially, but for studying the physical characteristics of the celestial orbs.

Prof. Eastman says the desirability of placing observations on high elevations is still a mooted point, and that the increasing interest in astronomical research at the present time seems to demand that some steps should be taken to solve the problem. He asserts that a thoroughly equipped observatory, competent to undertake and to continue the necessary routine work of such an institution, cannot be successfully established and maintained except in close proximity to a large city, etc. If, however, an elevated and suitable site can be obtained west of the Mississippi, where the peculiarities of the climate and the purity of the atmosphere materially increases the penetrating or defining power of the telescope it would be very desirable to establish there, one large telescope for research and discovery, leaving the routine work to the older and complete observatories. He suggests the equipment of parties in localities to test the question in the transit of Mercury, May 6th, and total solar eclipse of July 29th.

Prof. Holden says that his remarks are based upon his experience, and upon the following published reports of experiments undertaken for the object in view:

C. P. Smythe, Tenerife—An astronomer's experiment. London, 1858.

C. A. Young—Report on astronomical observations at Sherman, Wyoming. Appendix No. 8, U. S. Coast Survey Report, 1872.

George Davidson—Astronomical observations in the Sierra Nevada. Appendix No. 9, U. S. Coast Survey Report, 1872.

Henry Draper—Astronomical observations on the atmosphere of the Rocky mountains. *American Journal of Science*, Vol. XIII, page 89. He says that "all the above mentioned reports testify to the extraordinary transparency of the atmosphere at great altitudes," and mentions his own favorable experience in 1873 at an altitude of 9,600 feet. He also says that the general testimony of those who have observed at these high stations report that this great clearness is accompanied with great steadiness of the stars, although occasionally both conditions are favorable. His conclusions are that for regular and continuous work, a site near the present Naval Observatory can be chosen for all necessary work, but for special investigations a branch observatory having a new 26-inch refractor should be established at some elevated station.

Several points are worthy of particular note in this recent movement; not however new to the members of the California Academy of Sciences, but important enough for repetition.

First, That great elevations are better for astronomical researches than lower ones, when the stations combine favorable physical and

meteorological conditions. These conditions have been shown in that communication to the Academy, announcing the endowment of the Lick observatory, to exist in California; and confirmed in the report upon observations in the Sierra Nevada.

Second. That the stations selected for such work should not be upon great plateaus; on the contrary, they should be upon elevated, isolated peaks, or upon well-marked and pronounced mountain ridges, such as the Sierra Nevada or San Bernardino, and that the elevation should be not less than 8,000 to 10,000 feet above the sea. This is a point upon which the professors quoted are in error. They always refer to elevated plateaus and never to isolated peaks or chains.

Third. The climatic conditions must be favorable; the mountain chain must have prevailing clear weather; such cloudy conditions as exist on the greater part of the Andes in South America would be totally unfit for the observations proposed. Long continued periods of stormy winds would be considered a very unfavorable condition. Locations where the surrounding atmospheric conditions are different would be unfavorable, such as a station on the border of a lake where the atmosphere would be largely charged with aqueous vapor over the lake, whilst the atmosphere over the adjacent land would naturally be comparatively dry; yet variable winds would complicate the conditions. Such locations as Mt. Diablo and Mt. Hamilton are also extremely unfavorable, because the atmosphere to the westward is laden with aqueous vapor from the summer fogs, whilst the dry air of the San Joaquin valley keeps back these fogs as if a solid physical barrier was interposed. Moreover, the evidence of the wind-torn bushes weighs against the adaptability of such locations.

Fourth. The authorities quoted do not report great unsteadiness of the stars with the great transparency of the atmosphere. On the contrary, the steadiness of the images of the stars, planets, sun and moon are especially noted in Davidson's reports to the Academy and to the Superintendent of the Coast Survey. Moreover, this is the logical sequence of the conditions which constitute unsteadiness. Were the atmosphere at the surface of the sea twice as dense as it is and were the aqueous vapor capacity twice as great as now exists, the result would be vastly increased unsteadiness of the atmosphere; the eye would see twice the aerial disturbance that it now sees over a wheat field in a hot summer day and telescopes could not use advantageously half the power they use at present.

So if we ascend to a height of 10,000 feet, where the atmosphere is only two-thirds of the pressure at the sea level, the atmosphere loses its capacity for carrying aqueous vapor and for consequent disturbance of the atmosphere. Higher powers may therefore be used with the telescope, which has also acquired greater space-penetrating power on account of the tenuity of the atmosphere.

Fifth. If an honest movement is to be made in astronomical research, those who undertake it must make some personal sacrifices in the cause. The opinions quoted indicate a love for the comforts of a great city wholly incompatible with the devotee who searches for truth for truth's sake. It is true that questions of salary must be considered, but the enthusiasm and zeal that project and carry out such researches look more to unfolding new discoveries than the devising of absolute personal comfort. For work of the character indicated in this new era, we need men who will have the disadvantages of comparative isolation for the greater glory of advancing the higher knowledge demanded by the mental activity of the nineteenth century.

Sixth. Years since it was proposed to this Academy that the proper mode for determining the best location for an astronomical observatory was actual experiment and comparison of several stations fairly indicated by given favorable conditions. The professors quoted adopt the same view and indicate the phenomena of May 6th and July 29th as tests. But the deduction from the observations of a few hours might be wholly illusive and delusive. The series of observations for such a purpose must extend through at least a year, involving the various climatic conditions of the seasons. Less than that will hardly be accounted satisfactory.

In conclusion, this Academy can well lay claim to having been among the first, if not the first in the field, for the location of astronomical observations at great elevations for the purposes of research and discovery. And it naturally continues its interest in a subject that now promises to lead to great, although but partial advantages.

SULPHUR AND QUICKSILVER.—They have now at work, says the *Healdsburg Enterprise*, from 10 to 15 men on the sulphur and quicksilver mine near the Geysers. About two tons of sulphur, worth, in San Francisco, \$50 per ton, are taken out daily. They employ here an original and superior process for the reduction of the crude sulphur, which produces an article that commands the highest price in the market. The sulphur is packed in boxes of 175 pounds each and they now have ready for shipment over 40 tons. They also have a large accumulation of quicksilver ore on the dumps and will at once commence to haul material to the mine for the construction of a 10-ton furnace to reduce the ore. The mine will pay to work for the mercury, although it is estimated that there is \$40,000 worth of sulphur in sight.

Doing and Over-doing.

If we write nothing new let the excuse be that the words are true. The time is just upon us when the farmer is most apt to overstep the boundary between doing and over-doing. The harvest labor, heavy in its gifts, is apt to be as well heavy in its drain upon the vital force both in brain and muscle. The mind is charged with excitement. It is working at its highest speed. It is off its guard. It puts the whip and spur to physical power and endurance until they too are acting at their utmost tension. Our harvest operations are in many cases carried on upon so large a scale that he who commands the field has enough on his mind and hands to keep half a dozen men well employed. And yet, as a general thing, the work either does not admit of division, or there are no fit ones to share it and the grain grower must assume the whole task, with its great responsibilities and its thousand details, and conquer, or he conquered by it.

Although there is but a step between doing and over-doing, it is a step which can only be taken at the cost of months of discomfort, or, sometimes, at the price of a life's strength and health. If the hurried, worried man could or would but stop to think of the small ratio which exists between getting the work sharply and successfully prosecuted and preserving his own mental and physical power, he would be safe. The rule is not to do this. In most instances there is but a single thought upon the mind, and that is the quickest route to the accomplishment of the task. Thus the man is driven before the wind of determination, and, like a ship without a rudder, his strength, robbed of the guidance of its mental guardian, rushes wildly on its course, with nothing to turn it from lurking dangers.

In the hope that, speaking thus early, we may gain possession of minds which soon will pass beyond the reach of editorial preaching, we are led to mention a few points which are generally regarded as foundation stones in the structure of well accomplished tasks. First, we would note that, generally, it is not work which weakens the frame and unseats the mind. Rather it is anxiety and its fretful handmaid worry, which as a bad associate of work, misleads it and hazards its success. Calm, and yet sprightly and vigorous, effort does not injure a man, but is rather salutary in its effect. The mind gains strength, the muscles grow, under such exercise. The appetite is sharpened and sleep is promoted by healthful exertion. Diametrically opposite is the effect of anxious, nervous effort. A man's strength is lashed by it until it undertakes the impossible, and it falls back weakened if not broken. The mind is spurred into a tremulous excitement which robs it of its power. Appetite departs. Sleep becomes a mockery; and the tossing victim yearns for the faintest light which shall return him to the labor of the day which wears him even less than the dreams of the night. Such is the contrast between the two conditions of doing and over-doing. It may be seen in all occupations of men which call for supreme effort. The way to secure a condition of effective doing, with certain limitations of natural disposition and temperament, is to begin with the determination that no matter how great the emergency which may arise, a man shall calmly master it and not be mastered by it. Resolve beforehand to be the victor, not the victim. Let everyone to whom the coming weeks shall bring manual labors decide now that he shall rule his own mind and strength, and no contingency shall be too difficult or vexing for his triumph over it.

In addition to storage of will to meet the duty of the days, there is also a matter of daily regime to be observed. This is regularity of habit. It is, we believe, the general dictum of both science and experience, that the way to meet unusual labors is not by artificial stimulants which are transitory in their effects, but by reliance on natural agents, which are more lasting. Therefore let the taking of sufficient and nutritious food be a matter of religious regularity. Do not alternate between a famished and a surfeited condition, for weakness is sure to follow. Above all be as regular as possible in wooing "nature's sweet restorer," sleep. He who eats well and sleeps well, arises each morning a tower of mental and physical strength, and he who endangers his hold upon these recruiting agencies, renders himself liable to all the ails and weaknesses which we have named and more besides.

We have spoken especially of the rules of strength and weakness as relating to the lord of the manor, but they apply with certain relevance to its mistress. Harvest hurry is apt to unsettle the whole household. Upon the housewife fall unusually heavy burdens and cares. She too must be "mistress of herself though China fall." She must not worry herself with too much serving. She must have no midnight tasks of preparation, nor midnight dreams of runaway servants and laborers clamorous for their rations. Let her too prepare for whatever extra cares the days may bring, by the cultivation of a quiet determination to let no trouble rattle the serenity of her disposition, nor disturb the even balance of her thought. It is doubtless true that in this State our farmers' wives are somewhat less burdened with harvest pro-

viding and lodging than their Eastern sisters, and yet the tumult in the field is sure to invade the quiet of the home unless its mistress meet it at the threshold, with the tranquility of her disposition and the firmness of her resolve. Let but the wife with her gentle influence and peculiar tact undertake to rule the troubled harvest host from her quiet throne in the home, and she can often rescue her lord from the consequences of a thoughtless over-doing, and thus ensure a glad and successful harvest home.—*Rural Press*.

Mines that have Never been Found.

In almost every mining town and camp of the Golden State the old settlers tell of places where streams, and gulches and ravines were immensely richer in placer gold up to a certain point, when they suddenly ceased to pay. Somewhere in the neighborhood, doubtless lies the channel whence came the gold found below, but no man has ever been able to hit upon it—is one of the mines that have never been found. Sometimes, on a flat or in a sag on the side of a hill or mountain, the placer miner has unexpectedly found great quantities of bright quartz gold, or fragments of quartz rich in gold. In vain he searches for the lode from which came the gold and the quartz; it remains one of the mines that have never been found. In places not only fragments, but also great blocks and howlders of quartz filled with gold are found, and for a time diligent search is made for the place whence it came; but, one after another the prospectors became discouraged, and, finally, the source of the gold is set down among the mines that have never been found. We might furnish a list of not a few such places as are spoken of above, but shall leave a particular account of them to be given by the man who shall, one of these days, write the history of the mines that have never been found. Such a history would make quite a thick pamphlet, would include many interesting and romantic stories, and would be an incentive to prospecting and mining in many now almost deserted camps, provided some pains are taken to get at the facts in all cases. In California there is, doubtless, to-day more gold in the mines that have never been found than remains in all those that are known and worked.—*Territorial Enterprise*.

THE PUMPING MACHINERY FOR THE NEW YELLOW JACKET SHAFT.—Good progress is being made in getting the immense pumping gear of the Yellow Jacket mine at Gold Hill in place. This ponderous machinery, the heaviest ever constructed on this coast, and which was minutely described in the *PRESS*, March 2d, weighs, that on the surface and that in the shaft being included, over 700 tons. The sole plate of the high pumping engine is in place and weighs 102,720 pounds. It is 64 feet in length and is in seven sections. A few days ago they took into the building the shaft and cranks, which weigh 50,600 pounds. The weight of the surface bob is over 85 tons. These will be the heaviest pumping works on the Comstock, and as yet they have no water except that which comes out with the dirt. This heavy pumping machinery shows that the management purpose putting the shaft down to a great depth and that they intend to be so well prepared that they will not be stopped by any amount of water that may be tapped.

LOCOMOTIVE PERFORMANCES.—Several correspondents have favored the *Railway Age* with instances of remarkable locomotive performances, drawn out by the assertion of the president of a railway in India, that the average of 1,250 miles per month for six months, made by his engines, was probably unequaled in any country. First we had the item that an engine on the Atlantic & Great Western road made 3,681 miles in a month. Then the Cleveland, Tuscarawas Valley & Wheeling reported an engine making 51,395 miles in a year, and as high as 5,640 miles in a month. The Lake Shore & Michigan Southern followed with a record of 45,000 in nine months averaging 5,000 per month, and in one month reaching 7,007 miles. Manager Hood of the Western Maryland, now gives some exceedingly interesting statements showing the performances of several of his engines, one of which made the extraordinary record of 59,953 miles in twelve months, at the remarkably low cost for repairs of one and one half cents per mile run. Thus far the Western Maryland has the palm on annual work by a single engine.

GOLD MINING IN GEORGIA.—Professor Little the Georgia State geologist, states that "there are now 26 active gold mines in Georgia that are now being worked properly and systematically. There are in these about 260 stamps. The average yield per stamp is \$100 per month. This would give us a yield of \$25,000 per month, or \$300,000 per year. But the number of stamps at work is continually increasing. I know of a purchase being made that will put a new mine to yielding at once. And take Porter & Meakin's factory; there are now there, in process of completion, one 20-stamp mill, one 10-stamp mill, and some smaller mills, or 50 stamps in all. These will increase the yield \$5,000 per month, or \$60,000 per annum. I should not be surprised if, by the 30th of June next, we should have mills in sight that would produce near a half million a year, or over treble the production of the previous year."

MECHANICAL PROGRESS.

Points on Rotary Cutters.

Prof. Sweet, of Cornell University Mechanical School, gives the *Polytechnic Review*, some notes on milling machines, in which he speaks of rotary cutters. He says a rotary cutter has its advantages and disadvantages. As a simple cutting tool it is costly to make and keep in order; and for doing plain work that can be done in the lathe or sharpening machine its economy is doubtful. But the cutter, when made, possesses a number of cutting edges which will do a large amount of work before they get dull, and which are hence, especially fitted for producing irregular forms. There is a great diversity of practice in regard to the number of teeth in the cutters, which must be of necessity partially owing to the size and kind of materials operated upon, and mainly because of the difference in the stability of the machines. If the machine is frail and the work light, a five tooth cutter is necessary. If the machine is absolutely rigid and the work firm, then a cutter of either few or many teeth can be used.

It is desirable to use a coarse-toothed cutter when possible; first, because it can be sharpened without drawing the temper; and, second, because every cutting edge can then be made to cut and so work faster. When there are too many cutting edges, a part of them are sure to slide over without cutting, thus dulling and burning down the metal, making it all the harder for the following cutting edge. In work of an irregular form, but not such as requires absolute size (such as the grooves in a tap or a reamer), the cutter can be ground by hand on an emery wheel or a dry grindstone, without any other requirement than experience; but for work requiring absolute accuracy, the cutter should be formed like Brown & Sharpe's cutters for cutting tooth wheels, so that they can be sharpened by grinding the face, without changing the form. Many times in the making of cutters for a single job, or for a special job where there is but little to do, much time and money are uselessly wasted by making the cutter as complete as would be possible for a standard tool. Often a four, three, two, or even a one tooth cutter can be made and the job finished in less time than it would take to make a complete circular mill. Tempering cutters, so as to maintain their truth, is not a job that every smith can do; and with a cutter of one to four teeth, each tooth can be tempered separately, and the danger from springing avoided. A two or more tooth cutter sprung in tempering is sure to cut wider than itself, but a single tooth cannot. Cutters made to cut upon their end exclusively should have but few teeth; two, three, or four are likely to give better satisfaction than more.

A NOVEL METHOD OF INLAYING WOOD.—The following is an interesting process recently patented in England: A veneer of the same wood as that of which the design to be inlaid consists—say sycamore—is glued entirely over the whole surface of any hard wood, such as black walnut, and allowed to dry thoroughly. The design is then cut out of a zinc plate, about 1-20th of an inch in thickness, and placed upon the veneer. The whole is now subjected to the action of steam, and made to travel between four cast-iron rollers of eight inches diameter by two feet long, two above and two below, which may be brought within any distance of each other by means of screws. The enormous pressure to which the zinc plate is subjected forces it completely into the veneer, and the veneer into the solid wood beneath it, while the zinc curls up out of the matrix it has thus formed, and comes away easily. All that now remains to be done is to plane down the veneer left untouched by the zinc until a thin shaving is taken of the portion forced into the walnut, when, the surface being perfectly smooth, the operation will be complete. It might be supposed that the result of this forcible compression of the two woods would leave a jagged edge; but this is not the case, the joint being so singularly perfect as to be unappreciable to the touch; indeed, the inlaid wood fits more accurately than by the process of fitting, matching and filling-up with glue, as practiced in the ordinary mode of inlaying.

CAR LIGHTING.—Those who have passed miserable hours in the sepulchral light of railway cars will be glad to know that Mr. Webster Wagner has devoted much time to investigating the best method of lighting railroad cars, and has hit upon a discovery which is thus described: "The lamp has a shape not unlike that of a telescope. The larger end, at the bottom, causes a fan to oscillate, and this in turn gently forces the lard oil from the reservoir in the upper joint, saturating the wick, and making a light of surpassing brilliancy, steadiness and strength. The apparatus is wound every ten hours. No chimneys are required, and this saves much time, expense and annoyance. The light has a power equivalent to 13 candles. These lamps are furnished to each car, and a person is enabled to read the smallest print without the slightest difficulty. As soon as possible all the Wagner sleeping cars will be equipped with them."

A GREAT AMERICAN GUN.—The Ordnance Department of the Army has constructed a large rifled gun, weighing about 90,000 pounds, with a caliber of 12.25 inches, which is now undergoing proof at the Sandy Hook proving ground, under the direction and supervision of the Ordnance Board. So far the limited firings have developed the most satisfactory results. The gun is of cast-iron, lined with a coiled wrought-iron tube, with a length of bore of 227 inches, and is mounted on a carriage of late design, with all the modern improvements to control recoil and to facilitate loading and maneuvering. Although as yet the firings have been limited, still enough is known of the power of the gun to say that for use against ironclads it is equal, if not superior, to any gun of the same caliber in any service. The essential features which contribute to any superiority over others in this respect are length of bore, character of projectile and powder. In the foreign services the English 12-inch wrought-iron gun has a length of bore of 198 inches; the Krupp caliber, 12,008, has 222.5 inches; the Italian, 12.6, has 252 inches, while the American is 227 inches long. This length adopted by the Ordnance Department gives all the usual effects that can be obtained from this source, and secures a thorough consumption of the maximum powder charges, as has been practically proved by the absence of any unconsumed grains of powder after the discharge.

A MONSTER LOCOMOTIVE.—A monster locomotive, says the *Car Builder*, is in process of building at the Springfield shops of the Boston & Albany road. Its weight will be about 40 tons. The boiler is 10 inches longer than the standard, with 173 flues—11 above the ordinary number, and 4½ inches longer—12 feet three inches long, and two inches in diameter. Of the inside fire-box the side sheets are 60 by 60 inches, and the flue and door and crown sheets 60 by 42 inches. The total area of heating surface is thus 455 17-24 square feet, not considering the forward flue sheet. The cylinders, with 8 by 1½ inch ports, are 18½ by 28 inches, the largest heretofore being 18 by 26, and the two pairs of drivers are 4½ feet in diameter, which will bring the keys in the crank pin straps within about four inches of the dirt. The frame is straight, and 4 by 3½ inches, the standard being 3 by 3½, and six inches longer than usual. The "slab" part of the frame is in a single piece, "slotted" out in the center, so that the double slab form is retained with the advantage of being naturally united at the ends, which are riveted to the "jaws." The yokes, through which the crank rods play, are to be of one piece, instead of independent of each other as heretofore. Then side plates will be placed inside the drivers to make life secure in the cab in case of breaking tires.

OUR MACHINERY SHOW AT PARIS.—Edward King, writing to the *Boston Journal*, says: Our display of machinery is well chosen, but when we remember that the galleries devoted to machinery on each side of these colossal buildings on the Champ de Mars are considerably longer than Machinery Hall and the Main Building at Philadelphia put together, and that we occupy only an insignificant space—small by comparison with countries like Austria or Russia, countries which cannot supply one-tenth of the inventive ability possessed by the United States, it is a keen cause for regret. Our delay, our wretched, inexcusable delay, was the reason for this little and meager exhibit of our chief talent. We were compelled by a government who did not comprehend the importance of the exhibition to postpone everything until the very last minute, and the result will certainly be humiliating. The department of Italy—not far from ours—is to be regal in its splendor, and extends over two or three times as much space as ours. It certainly was a mistake to allow ourselves to be distanced by any country. We should have been greedy, and taken every particle of space that we could get by applying at an early day.

DANGEROUS BOILERS.—The *American Machinist* says: Since competition in boiler-making has brought down prices of first-class work where there is very little margin for profit, a great deal of poor material has been used in boilers in order to save a small percentage of the cost of safe and reliable material. Plates intended for marine boilers are required by law to be stamped with the tensile strength the iron or steel will stand; but plates for stationary boilers may be weak and unreliable, yet the government does not interfere to prevent their use. A rigid inspection law, applying to land as well as marine boiler material, would considerably lessen the danger incurred in the use of steam, if properly enforced. Some boiler-makers are criminally careless in the employment of material, well knowing it to be dangerous to place in a boiler, yet working it in so as to save a few dollars. We learn, on good authority, that several manufacturers of boilers have openly expressed themselves as utterly indifferent as to the strength or safety of the boilers they made, after they had been sold and the money obtained.

IRON BOLTS.—Iron bolts in wooden structures are always attacked by rust, which diminishes their size and loosens their hold. A simple remedy is now discovered. Bolt holes are coated with a mixture of zinc filings and grease. The iron is thus galvanized and preserved from oxidation. It is a French invention.

SCIENTIFIC PROGRESS.

Our Distance from the Sun.

At the late meeting of the National Academy of Sciences in Washington, there was an issue raised between English and American observations on the last transit of Venus and the resulting determination of our distance from the sun. California was represented in the discussion by Prof. Davidson. The victory would appear to be in favor of American observers. The subject was opened by an elaborate paper from Prof. C. H. F. Peters, of the Litchfield Observatory of Hamilton College. Prof. Peters began by giving a rapid review of the various values obtained for the solar parallax since Halley's method was put in practice; the defects and merits of these calculations were also briefly alluded to. The estimate obtained by Prof. Newcomb from a consideration of all the values from different methods was spoken of with approval; it gives the most probable figures as 8".848, with a plus or minus error of 0".013. (This is in miles, for the sun's mean distance, 92,381,000 miles, with the proviso that it may be as much as 92,517,000 or as little as 92,245,000.) Sir George B. Airy, the Astronomer Royal, has recently promulgated his results obtained from a study of the British telescope observations made at the last transit of Venus. He deduces a parallax of 8".76. This extraordinary result, which would carry us back toward estimates that have been largely discarded by astronomers, has excited general surprise. It is equivalent to a distance of 93,310,000 miles. In short, it may be properly stated that the British telescopic observations have really given us no new data for the parallax. They are not incompatible with previous estimates, but they prove nothing either way. Undue weight has been given by Prof. Airy to minor and very imperfect observations. Some curious instances were given. One of the observers had written to Prof. Peters: "We got nothing;" yet the indefinite notes were incorporated into Prof. Airy's calculations.

An exceedingly interesting discussion followed. Prof. Davidson pointed out other sources of error in the calculations of the Astronomer Royal. Prof. Newcomb said that an extraordinary fatality had attended all determinations of the parallax, and gave reasons for thinking that 8".88 might be the figure ultimately adopted. (This would make the distance 92,043,000 miles.) Prof. Young stated that he had just received information which he believed was entirely new in this country; that Mr. Stone, taking the same data that Prof. Airy had used, has arrived at a value of 8".88, precisely the same as Prof. Newcomb had just assigned. This announcement created a marked sensation among the academicians, and was followed by a round of applause.

THE INFLUENCE OF HEATING ON WHEAT.—Although the wheat produced in this State is so thoroughly dry that there is little danger of the heating experienced in other countries, it is of interest to note the results gained by French investigators as to the effect of the heat which moist new grain stored in bulk, evolves. When new wheat is placed in an open vessel or in heaps on the floor, a spontaneous heating will soon take place, and fermentation will begin; that kind of fermentation or chemical change which invariably precedes the sprouting of wheat. A vinous smell will be disengaged, and this smell will soon become acetic, and in a short time the wheat will be entirely spoiled and unfit for ordinary milling purposes. It is therefore clear that in most European climates it is impossible to keep new wheat either in hermetically close vessels or in heaps, with a constant access of air, before the water of vegetation or uncombined water which it contains has previously been expelled. The proportion of this water of vegetation must of necessity vary according to atmospheric conditions; it can, however, be determined pretty accurately, and Duhamel undertook some experiments on the subject, the result of which is on the whole satisfactory. Some two years' old wheat and some new wheat were submitted to the same treatment. They were first placed for a space of 24 hours in an oven heated to 47° 5 C., say about 10° above the temperature of the warmest summers. They both lost 1.32, or about 0.03125 of their weight. The temperature of the oven having been raised to 63° 3 C., a portion of the same two samples of wheat was left during another 24 hours, and their respective weights were lessened by 1.16, or 0.0625. These wheats were then sown in suitable ground. The new wheat germinated and grew well; the old wheat did not grow at all.

DEATH OF PROF. HENRY.—An item in last week's PRESS announced the death of Prof. Henry, of the Smithsonian Institute. The deceased has held the position of Secretary of this institution since 1846. He was a native of Albany, New York, and was in his eighty-second year. He early developed a genius for mathematics, and was in 1827 appointed Professor of Mathematics in the Albany Academy. In 1827 Prof. Henry began making experiments with electricity. It has been claimed for him that he was the first person to demonstrate the principles by which intelligence is conveyed through the agency of the telegraph. The deceased contributed several scientific papers to the *American Philosophical Transactions* and to the *Council of the Franklin Institute*.

The Ocean's Floor.

At a recent meeting of the Academy of Sciences in Washington, Prof. Alexander Agassiz read an essay descriptive of the results of the Blake expedition, with which he was connected. He has passed over, for purposes of sounding and survey, a distance of 1,800 miles in and adjoining the Gulf of Mexico. The work of observation was begun at the point where it had been left off by his predecessors in deep-sea dredging for that region—his father, Prof. Louis Agassiz, and Count Portales. They had, indeed, run one or two lines of dredging across the gulf, but it was done with the imperfect appliances of that day and brought no complete results. In depths exceeding 500 fathoms, for instance, Count Portales found little animal life, and at that time there was a general belief that the limit of existence had been nearly reached at such depths.

The following observations are reported by Prof. Agassiz: Where the depth is 1,800 to 2,000 fathoms inside the Windward islands, the fauna corresponds to that of the Atlantic outside, the animals having doubtless penetrated through the openings between the islands. All classes of the animal kingdom found in the ocean are well represented. Inside the Caribbean sea, the fauna is more specialized and characteristic. On the *Challenger* expedition it had been ascertained that the red clay ooze of the ocean bottom was largely a result of the decomposition of the shells of surface animals—a disintegrated portion of the limestone contained in those shells. Everywhere in the gulf a similar deposit was found. Pelagic animals, chiefly mollusks, may be said to fill this sea from the surface to eight, 10 or 25 fathoms in depth. There is no doubt that a stratum is forming at the bottom of the sea due entirely to the coverings and hard parts of pelagic animals which exist in swarms near the surface. On the question as to the existence of many animals in deep water, near neither the surface nor the bottom, Prof. Agassiz is inclined to distrust the *Challenger* observations. The apparatus there used could not furnish proof as to the point whether the animals were really caught at the depth of 1,000 fathoms or near the surface.

Prof. Agassiz is not yet prepared to throw additional light on the question of sight by pelagic animals at great depths. The fact remains that at these depths there are found creatures of two classes in respect to vision: one eyeless, or nearly so, and with curious changes of structure taking the place sometimes that the eyes should occupy; others in a totally opposite condition, having eyes enormously developed, as if to enable them to see with the smallest modicum of light. This is true at depths of 1,500 to 1,900 fathoms or more, both as to crustaceans and fishes. It seems strange that the same conditions should have produced diametrically opposite results. In the discussion which followed, Professors Cope and Gill both regarded the two lines of development of obliterated and increased vision in animals at great depths as a natural result of the evolution hypothesis; just, in fact, what we might expect.

Microscopic Examination of Bee Stings.

At a recent meeting of the New York Microscopical Society, Mr. J. D. Hyatt, President, gave an account of his investigations on the subject of stings. These studies have extended over a period of eight years, but only recently have some obscure points been made out. The general form of the stinging organs of the honey bee is well known by microscopists. It consists of a horny sheath, within which there are two stings, and these, when in use, are thrust out. There is a poison bag which discharges its contents into the sheath. This is a point well known, but it appears that the precise method by which the fluid makes its way from the sheath into the wound has not heretofore been properly explained. According to the generally accepted explanation, the poison is supposed to flow in a channel formed between the two piercers or stings and in this way makes its way into the wound. Mr. Hyatt advances another hypothesis and believes that he has positive proof that he is right, having dissected and examined upwards of 1,000 stings.

After long and patient investigation the explanation offered is as follows: At the back part of the sting these channels open into the sheath, and just in front of that opening, attached to the stings, is a sort of valve which projects into the sheath. When, in the operation of stinging, the piercers are thrust out, they carry forward this valve so as to close the front of the sheath, for which purpose they are admirably adapted, and the poison thus confined within the sheath makes its way out through these openings in the stings. When once understood the operation seems very simple. There are also some objections to the common explanation. Cross sections of the stings show that the walls are quite thin, but strengthened in certain places by internal deposits. The form of the stings is such that no channels can be formed between them to conduct the poison.

GARNET IN CORUNDUM.—Mr. J. C. Trautwine, C. E., says that he has found garnets imbedded in the corundum of Jackson county, North Carolina. The *Polytechnic* believes that this association of these minerals has never before been observed.

500 Almonds.....24	75 Belcher.....12
40 Alpha.....10 @ 10	60 Best & Belcher....12
80 Alts.....53 @ 53	40 Chollar.....25

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

THE ADVANCE.—*Chronicle*, May 11: This company yesterday commenced taking out good ore from the north drift, on a contract to furnish Carter & Adams, agents of the Frue concentrators, 5,000 tons, to be worked at the company's mill, below Mt. Ballion, which is to be placed in running order as soon as possible and furnished with Frue concentrators.

THE DOUBLE STANDARD.—This mill has this week been running on high-grade ore. On Thursday a blast brought down ore which assays \$1,000 a ton.

AMADOR.

KEYSTONE.—*Ledger*, May 18: A small pocket of rich ore was struck in this mine on Wednesday. It embraced several tons, the whole of it speckled with gold. The rock was sent to the surface in sacks, it being too rich to be handled in the ordinary way.

MONTERICHARD.—The mill was cleaned up Saturday, yielding 12 pounds of bullion. This result, though nothing to boast of, equaled the anticipations of the managers for the first run. A good deal of gangue was passed through the batteries, thereby reducing the average. There is nothing in this send-off to justify despondency, although, it is true, there is no margin of profit. The Directors are confident that the next run will show a decidedly increased average per ton.

THE PHENIX is running full blast. Extra men are being employed every day at this institution. The mine and its surroundings appear to be in a most prosperous condition. The new hoisting engine is being placed in position.

BUTTE.

NUGETTS.—*Mercury*, May 17: N. W. Slater, of Forbestown, came into our office, last week, with a handful of gold nuggets, one of which was valued at about \$140. The balance were valued at from \$5 up to \$12. Mr. Slater has been mining in a ravine near Forbestown for some time, and the nuggets which he showed us were specimens of the kind he was taking out. The mines around Forbestown are showing better indications every day.

CALAVERAS.

WALLACE & FERGUSON MINE.—*Chronicle*, May 18: Extensive improvements are being made in the Wallace & Ferguson mine, at Sheep Ranch. The main shaft has been enlarged and divided into compartments preparatory to erecting new and powerful hoisting works. It is the intention of the company now owning the mine to thoroughly prospect and develop it. With that view the main shaft is to be sunk 100 feet deeper immediately, although there is first-grade ore enough in the levels and stopes now opened to keep the mills employed for a long time to come.

UPPER COUNTRY JOES.—Sinking the shaft in the Doyle mine, at West Point, has been temporarily suspended in consequence of the disabling of the boiler that run the hoisting works. A new one is to be put in and sinking resumed. At Mosquito, the crushing of rock from the San Bruno is completed and the stamps have been set at work on Blue Jay ore. Mr. Holmes is putting machinery on the Albers mine, at Mosquito, and will have it in readiness to run in a few days.

MILL RUNNING.—Messrs. Wallace & Brady, owners of a very promising quartz mine in Wet gulch, Jesus Maria district, who leased the Livermore company's mill, have got the stamps running. They have built a road from the mine to the mill and got everything in such good shape that they expect to be able to keep the battery constantly employed.

SLITER & CO.'S MILL.—All the machinery for Sliter & Co.'s mill, to be erected on their gravel claim, in Old Woman's gulch, is on the ground and will be put up as soon as possible.

INYO.

MODOC.—*Coso News*, May 11: Both furnaces are now running to perfection and turning out 200 bars of bullion every 24 hours, the bars weighing an average of 85 pounds each. Thirty-eight tons of ore are run through each 24 hours. The fact that there were 50,000 bushels of coal on the dump to commence with, a reserve of 10,000 bushels at the kilns in Wild Rose canyon, and the further fact that Mr. Gupitll has put a force of men at work to run the ten kilns, of 42 cords capacity each, and to burn also in pits, and is also purchasing coal from this side of the mountain as well, is pretty good evidence that the Modoc furnaces will run for a long time. Shipment of the rich bullion was commenced on the 8th instant, ten tons being sent to San Francisco, and 20 tons more followed on the 10th. Mr. Gupitll expects to ship ten tons daily, and undoubtedly that amount will be increased, as at present Mr. Arents is running on the hardest ores on the dump to smelt. The mines are looking well and yielding the usual amount of ore, more than sufficient to keep the furnaces supplied.

MINIETTA BELLE.—This company has recommenced operations on the mine which is looking very promising, with a good body of ore in sight, a number of miners have been put to work thereon, and in a short time it is expected that enough high grade ore will be taken out to start the mill up.

NEVADA.

THE OLD MURCHIE.—*Transcript*, May 19: This property which has for some time now occupied a prominent position as one of the leading mines of Nevada county, is by the addition of frequent important improvements daily increasing its yield, and the best feature of all is that the owners are amply repaid for their efforts in enlarging operations. A double track is being laid from the hoisting works to the mill, by means of which the vast amount of labor heretofore used in hauling quartz will be dispensed with, and cars will be used for the purpose of transportation. A new hoiler has been procured for the hoisting works, and it is being put in place at present. The mill is to be also shortly provided with a powerful new engine.

GEORGE SMITH'S MINE.—Drifting is now being vigorously prosecuted in the Smith quartz mine, and the indications are that a week's more dead work will enable the owner to commence taking out pay rock again. This reliable mine has yielded some handsome results for the expense which has been incurred in its development.

THE PIONEER MILL.—The Pioneer Reduction company's quartz mill is kept busy with rock from the depths of the New England and Brunswick mines. The sulphuret reduction works connected with the above extensive enterprise will also be in full operation in a few days.

DERRECK CLAIM.—Rich gravel has been struck in the shaft of this company, sunk on the old buried channel above North Bloomfield. The strike is considered one of importance as proving the existence of the old channel at this point. This greatly strengthens the probabilities of a similar strike in the Watt shaft four miles further up the channel.

PLACER.

YOU BET.—*Dutch Flat Forum*, May 16: The mines are all running and doing well. The English company have cleaned up with very good results. A small slide in the Hussey claim delayed the work some, but they have got it all right again. A general clean-up was made in this mine with satisfactory results. The Nevada company are rushing things ahead lively, and in a few days will have another claim under full headway.

DUTCH FLAT.—A clean-up of over \$4,000 was made in the Baker mine on the 9th, after which a blast of 275 kegs of powder was exploded in the upper end of the pit, doing good execution. As there has been a falling off in the supply of water recently, washing will not be resumed in this mine before another week.

THE HAZARD MINE.—This mine is at present yielding gravel sufficiently rich and extensive to entitle it to a place among the first-class drift mines of California. Much money has been expended here and the owner has met with many reverses. Persevering, he has, after driving a tunnel some 2,000 feet, struck the Weske channel, and is taking out dirt rich in gold. He has arranged his sluices, etc., and commenced to wash, and henceforth we may expect to hear of regular shipments of the "root of evil" from the Hazard mine. The channel from where he struck it to where Weske is working on it, is estimated to be at least six miles long, which will keep them digging for many, many years, and which should contain, at the rate of yield thus far, more millions than ever came out of the Comstock.

PLUMAS.

JAMISON.—*National*, May 11: The mining outlook is first-rate. There will be water in plenty for months, more than the usual number of men will be working in the district, and a good deal of prospecting will be done. O'Neil is running a tunnel into the North Star Lode; the Bunker Hill company, under the management of Superintendent Doherty, are running a tunnel into Mt. Washington. They have a lead and will put up a mill on their ground, on Little Jamison, as soon as the melting snow will permit.

QUINCY.—Horace Smith and Dick Bell are getting out some rich quartz from a new location recently made by them on the head of Black Hawk. They think they will develop a big mine, and we hope they will.

SQUIRREL CREEK.—This portion of Plumas is showing undoubted signs of improvement. A couple of years ago our nearest neighbors were at the Eureka sawmill, about three miles away, and East Nelson was without an inhabitant. Now about a dozen men are at work there, some of them with excellent prospects for success. Paul Serrand, who has incorporated a company, is now running a tunnel to strike a quartz ledge on Bear creek. Chris. Kuck has fixed up a hydraulic and is opening a claim on Poplar creek, close by. Several families of the men engaged on the wood and timber contracts of the company are living in little houses near by; the sawmill has been moved a mile and a half nearer to us.

BUSH CREEK.—*Mountain Messenger*, May 18: This ledge has widened to 12 feet. The gold is distributed through its whole width. The mill was stopped a few days ago to clean up and make repairs. This rich quartz extends along the ledge north from the shaft 60 feet, to a certainty, as it has been found at that distance, and how much further no one knows. Thousands of tons of very rich ore are now in sight, and still the ledges continue to widen as the shaft goes down.

UNDER CONTROL.—The Bald Mountain company have the rush of water under control, and

are working a full force of men. About 30 inches is still running.

PLIOCENE.—The Pliocene shaft was cleared of water last Wednesday, and the work of sinking commenced. The shaft is very wet. The pump seems able to more than keep the water down.

ORIENTAL.—The workmen are still pumping at the Oriental mine near Alleghany, not having succeeded in getting the works quite clear of water. This is not of our own knowledge, but from hearsay.

ARCHAMBAULT reports water failing at Mt. Vernon, and they are about cleaning up for the season.

PAY.—The Golden Star company are finding good pay in their claims, having taken out gravel that paid a great many dollars to the car load.

TRINITY.

PAYING WELL.—*Journal*, May 18: Smith & Lowden, on Trinity river above Lowden's ranch, are doing good work this season and making money. They took out \$3,000 last month, working eight men.

TUOLUMNE.

THE WATER CO.—*Independent*, May 18: This company have completed their flumes and ditches, and commenced laying their seven-inch pipe from the top of Wolding's hill across south Sonora to the top of Schulz's hill, a distance of 2,200 feet, with 58 feet head, to convey water for mining and irrigating purposes, thus supplying a district heretofore without water in the dry season. This will supply citizens at the lower end of town, the Odd Fellows' cemetery, and also the Golden Gate mine.

SPECIMENS from the Ferguson mine, weighing 45 pounds, and containing \$900 in gold, have been sold in San Francisco for \$1,300—the intention being to work them into quartz jewelry.

THE Philadelphia mine has washed up \$4,100 for 10 days of 10 hours each, or \$410 per day. This shows well for a mere prospect.

Nevada.

WASHOE DISTRICT.

CON. VIRGINIA.—*Gold Hill News*, May 22: Daily yield, 350 tons of ore, keeping the California mill running to its full crushing capacity. The ore stopes on the 1300 and 1650 levels, where most of the ore is being taken from, show well and are yielding good ore. Retimbering the southwest drift on this level, from the C. & C. shaft, is going steadily ahead. A north drift will soon be started from the 1900 station of the joint Best & Belcher winze on the south line to connect with the south lateral drift now being run in the California ground on the 1950 level. The repairs to the Consolidated shaft are making better progress, averaging about 15 feet per day.

CALIFORNIA.—Daily yield, 400 tons of ore, keeping the Brunswick, Mexican and Morgan mills steadily running. The ore stopes on the 1650, 1600 and 1500 levels continue their usual yield of good ore, and are showing well. The east drift on the 1950 level has now penetrated to within 100 feet of the C. & C. shaft, the face still being in perfectly dry ground, while the bottom of the C. & C. shaft is still flooded with water. The 1950 station is now being opened in the shaft so that this drift and the shaft can be connected in a very short time. The face of the north lateral drift on the 1950 level is still in vein matter. This drift is intended to connect with the north drift on the 1900 level of the Best & Belcher joint winze. The station for the joint Opbir winze on the Opbir 1900 level is about finished.

SAVAGE.—No attempt was made to lower the water in the shaft during the week until yesterday, when the speed of the pumps of both the Savage and Hale & Norcross was increased and the water lowered to a point 32 feet below the 2100 level. This is being done in order that the Hale & Norcross may have a chance to put in another lift pump at a point 50 feet below the 2100 station. The east drift on the 1640 level has passed through the low-grade ore recently struck. The working facilities of this level have been greatly benefited by the erection of an engine and the forcing down of a circulation of good air.

OPHIR.—The ore in the bottom of the winze below the 1900 level still continues of good quality, and covers the entire size of the winze. Just how much more there is cannot be told until the 2000 level is reached, and east and west crosscuts are run. This winze is now down 93 feet, with a slight seepage of water coming in at the bottom. The station in the joint California east crosscut on the 1900 level is about completed, ready to start a winze downward to reach the 2000 level.

JULIA CON.—The water was entirely drained from the station and drift on the 2000 level day before yesterday, and men are now at work repairing the drift and putting everything in first class order for commencing the crosscutting of the ore vein. As soon as the drift is repaired and cooled, a crosscut east will be started to follow up the diamond drill hole recently run in which the favorable prospects were found.

YELLOW JACKET.—The north winze below the 2200 level is now down 278 feet, following the slope of the ledge. The bottom is in clay, quartz and porphyry and quite hard and dry. The stone dam on the 1730 level, to keep back the water flowing in from the "west country" at that point, is fast approaching completion. The large expansion and initial cylinders of the powerful new pumping engine, are in place.

SIERRA NEVADA.—Three drifts have been started and are now being run from the 2000

station in the south winze. Two of these drifts are crosscuts, one running east and the other west. The other is a main south lateral drift running in the vein. Immediately after opening this station a fine vein of solid, healthy-looking quartz was encountered, which gave low assays, but has not as yet developed anything of much value.

UTAH.—The south drift on the 1350 level has advanced to within 52 feet of the south line, leaving only about 125 feet for that and the north drift on the same level in the Sierra Nevada to connect. This air connection, when made, will greatly benefit both mines.

CROWN POINT.—Work in the mine is now confined to the running of the south drift on the 2300 level, to connect with the north drift from the 2360 station of the Belcher drain shaft.

JUSTICE.—Daily yield, 80 tons of ore. The ore stopes on the 800 and 900 levels do not show so well, much of the good ore having given out. The south drift on the 1300 level is showing a steady and favorable improvement.

CROWN POINT RAVINE.—Sinking the shaft deeper below the 300 level is making good progress. When the 400 level is reached, a drift west will be started to intersect and develop the large and promising ore vein found on the 300 level.

LADY WASHINGTON.—The face of the north drift on 1150 level is showing some very rich though small veins of ore.

SILVER HILL.—The east drift on the 900 level is steadily advancing, the face in a splendid vein formation, the quartz being of a much better quality than the most of that found on the levels above. The north drift on the 800 level is showing more ore.

BELCHER.—Sinking the south winze below the 1900 level is making good progress, the bottom in quartz and vein matter mixed.

GOULD & CURRY.—The west drift on the 1900 level is repaired, and the rock excavated in sinking the shaft is now run down to that level and hoisted through the east winze to the 1700 level.

CON. IMPERIAL.—The south drift on the 2400 level from the joint Alpha winze will connect with the north drift from the south winze in a day or two more, giving a much needed circulation of good air.

BEST & BELCHER.—The hoisting engine, cages and other machinery for prosecuting the work in the joint winze on the Con. Virginia line, is all in first-class order.

SUTRO TUNNEL.—During the past week the header has made about the usual rate of advancement, although the material passed through requires more careful and secure timbering than heretofore. Total length of tunnel last evening, 19,689 feet.

SUCCOR.—Owing to a breakage of some of the hoisting machinery, no work has been done in the mine during the week.

BULLION.—The work of sinking the main incline is going vigorously forward, the bottom still in good blasting ground. The east drift on the 1840 level is steadily advancing, the face in very favorable vein matter. The progress of the east drift on the 2000 level has been considerably interfered with by a strong flow of water, which was struck some days ago, but which is gradually subsiding.

HALE & NORCROSS.—The water is being steadily lowered to-day in order to enable the putting in of another lift pump at a point 50 feet below the 2100 level. Cleaning out and repairing the north drift on the 2100 level has made very rapid progress during the week, 100 feet of the drift having been repaired.

LEVIATHAN.—During the week somewhat better progress has been made sinking the incline below the 600 level, the rock being a little softer than it was last week, with more quartz seams coming in.

WARD.—Sinking the main shaft is being pushed steadily ahead, the rock in the bottom blasting out finely and the flow of water giving little or no trouble. An average of 2½ feet per day is made with the sinking.

ALTA.—Sinking the main shaft is going steadily ahead. It is now down 1400 feet. The flow of water is still strong.

CARBONATE POINT DISTRICT.

A PROMISING MINE.—*Sentinel*: This district, which is situated about 100 miles south of Sand Springs, is looming into considerable notoriety. During the past year two men have been working a location at that point, and have developed a very handsome mining property. They started in \$15,000 in debt, and have since taken out and shipped to San Francisco a large quantity of ore, realizing sufficient profit to not only pay off their indebtedness but to purchase, for cash, hoisting works and machinery of capacity to work the mine systematically and cheaply. Messrs. T. J. Bell and John Durning have taken a contract to burn a large amount of charcoal, from which we infer that the product of the mine is smelting ore and that a furnace will also be built. The nearest point to the railroad is Wadsworth, a distance of about 100 miles, and the same parties will establish a line of six-horse stages between the two places. A store will be started at Carbonate point, and Mr. Reveal will take charge of that portion of the enterprise. Mr. Durning is now in Eureka making arrangements to sub-let his coal contract, and will send out a force of coal burners as soon as practicable. We are indebted to him for the above item.

Continued from page 321.

The small volatility of ether gives only insignificant tensions, the latter being from one and a half to three pounds (above zero), at 23° to 27° Fahr., so that a very large pump is required to draw up a certain quantity of ether vapor.

The first half of the process being conducted under almost a complete vacuum, the least leak in joints, stuffing, hoxing, etc., will suck in air, which will seriously impair evaporation. After frequent evaporations and condensations, the ether becomes acidified, and is transformed into a less volatile isomeric body. This demands a frequent change of the liquid, at once a troublesome and expensive operation.

It also combines with the lubricants used for the piston of the pump; the resulting mixture is carried all through the apparatus, disturbing its regular working. A source of great danger is the easy inflammability of the ether, which almost excludes it from use on ships, or in other exposed situations.

By the use of sulphurous acid, (sulphurous anhydride, SO_2), most of the above mentioned difficulties are almost completely overcome. This exceedingly volatile liquid evaporates under atmospheric pressure at a temperature of 14° Fahr., and its tension at 95° Fahr., is only four atmospheres, it can thus be worked in all climates, under a moderate pressure. It does not act on metals or fats, but on the contrary, forms an excellent lubricant for the piston, etc., of the compressing pump. It is not combustible, but on the contrary is an excellent fire extinguisher, which is of great value on hoard steamers, etc., and also being very stable and indecomposable (if not in contact with water), a renewal is never necessary, except to supply the small quantities lost by leakage. The vacuum in the refrigerator is only from two to three pounds below the atmosphere, thus air will have no great tendency to enter, even should there be leaks.

Mr. Raoul Pictet, of Geneva, Switzerland, was the first to apply this liquid to the manufacture of ice and the production of cold on a large scale. The process for its manufacture discovered by him makes it the cheapest of all known volatile liquids.

The Pictet Artificial Ice Company of New York, which is the owner of the patent for the United States, has erected a complete apparatus to manufacture 24 tons of ice per day.

The plan and prospective views show the entire arrangement, except the boilers, which are in an adjoining building.

A is the engine, driving, by a prolongation of its piston rod, the acid pump, B, which is double acting. C is a rectangular iron tank, containing two cylindrical refrigerators of copper, D D, which are filled with copper tubes. Inside these cylinders, in the space surrounding the tubes, the evaporation of the sulphurous acid takes place and the cold produced thereby is imparted to the mixture of glycerine and water, which is then circulated in a way to be described further on.

Through the pipe, e, the vapor is sucked into the pump, B; on the return stroke it is compressed to about one-fourth of its volume, the pump being surrounded by water to absorb the heat generated by compression. The pump-rod is hollow and has water circulated through it to keep it cool and prevent damage to the stuffing-box packing.

When the vapor is compressed, it is forced through the pipe, E, into the cylindrical condensers, F F, placed vertically in an upright iron tank, G. The condensers are filled with tubes similar to the refrigerators, and cold water is pumped into the tank, circulating first through the tubes and then around the cylinders, cooling the compressed vapor to about 65°, whereby liquefaction is attained. The small pipes, a a, reaching to very near the bottom of the condensers, conduct the liquid again to the refrigerator, the flow being regulated by the small valves, b b.

On entering the refrigerator, the liquid evaporates, absorbing great quantities of heat, and thus it goes through the same process over and over again, each evaporation producing a certain quantity of cold.

The freezing liquid of glycerine and water is conducted by the pipes, d d, to a large tank, H, into which the hoxes, containing the water to be frozen, are immersed. The liquid enters at both ends of the tank, circulates around the partitions, e e, as shown by the arrows, and is finally drawn out at f by the pump, I, which returns it to the tank, C, where, by circulating around and through the refrigerators, D D, it is cooled and then again resumes its flow through the freezing tank, H.

The hoxes containing the water to be converted into ice are 12 by six inches and four feet high; they are made of sheet-iron, and, after being folded together, are galvanized, which makes them absolutely tight, so that the water in them can never become contaminated by any impurities contained in the freezing liquid which surrounds them. The boxes,

when immersed in the tank, are closed on top by a wooden cover and the entire tank is covered by hoards and woolen blankets to prevent any radiation of the cold. An iron swing-crane, K, sweeps over the entire tank, to facilitate the handling of the hoxes. Those that are frozen are taken out and put into the small tank, L, containing hot water, and after a few minutes the block of ice is sufficiently loosened to drop out of the hox; the ice is then stored away while the hox is filled with fresh water and goes back to the freezing tank. The ice produced by this machine is hard and clear and is about 10% more enduring than natural ice, which has been frequently tried by putting a piece of natural and a piece of artificial ice of the same weight together on the floor, when the natural would be melted first. This seems probable, when it is considered that the freezing liquid is kept up at about 19° to 20°; a temperature a very little above that can thus be imparted to the ice if left in the tank a sufficient time. Natural ice, however, its under side being always in contact with water of not less than 32°, will never be much below that temperature, although its top may be colder.

The prospective and plan views show the 24-ton plant, for a long time in operation in New York city, and now sold to Richmond, Va. The refrigerator is a plain copper, tubular boiler, immersed horizontally in a tank in the background and charged, once for all, with 1,760 pounds of the anhydrous sulphurous oxide. Through the tank a mixture of glycer-

inations of wood lined with felt, and the space between filled in with sawdust. The floor should be covered with a wooden grating, and two doors are necessary.

In all cases a supply of water must be provided for the oxide condenser, the cooler the better. When water is scarce, and it is necessary to use the same water over and over again, particularly in hot climates, it will be advisable to provide a shallow tank of sufficient capacity, placed under ground for the sake of coolness, and in which the water may spread over a large surface. A circulating pump is required to pump the water.

The smallest machine that is manufactured at present produces about 30 lbs of ice per hour, while the largest has a capacity of one ton. The Pictet Artificial Ice Co., of New York, is building machines for cooling industrial establishments in Chicago, and also one making 50 tons of ice per day for St. Louis; also marine engines for refrigerating and making ice for supplying an abundance of ice for the whole voyage of the vessels of the new Brazilian S. S. Line built by Messrs. Jno. Roach & Son.

For breweries these machines are of great value, and many have already been erected in hot climates where the brewing of beer formerly had been an impossibility. In this connection, it must also be considered that the erection and maintenance of costly ice houses can be dispensed with.

When the machines are to be used to produce cold air for cellars, warehouses, the holds of

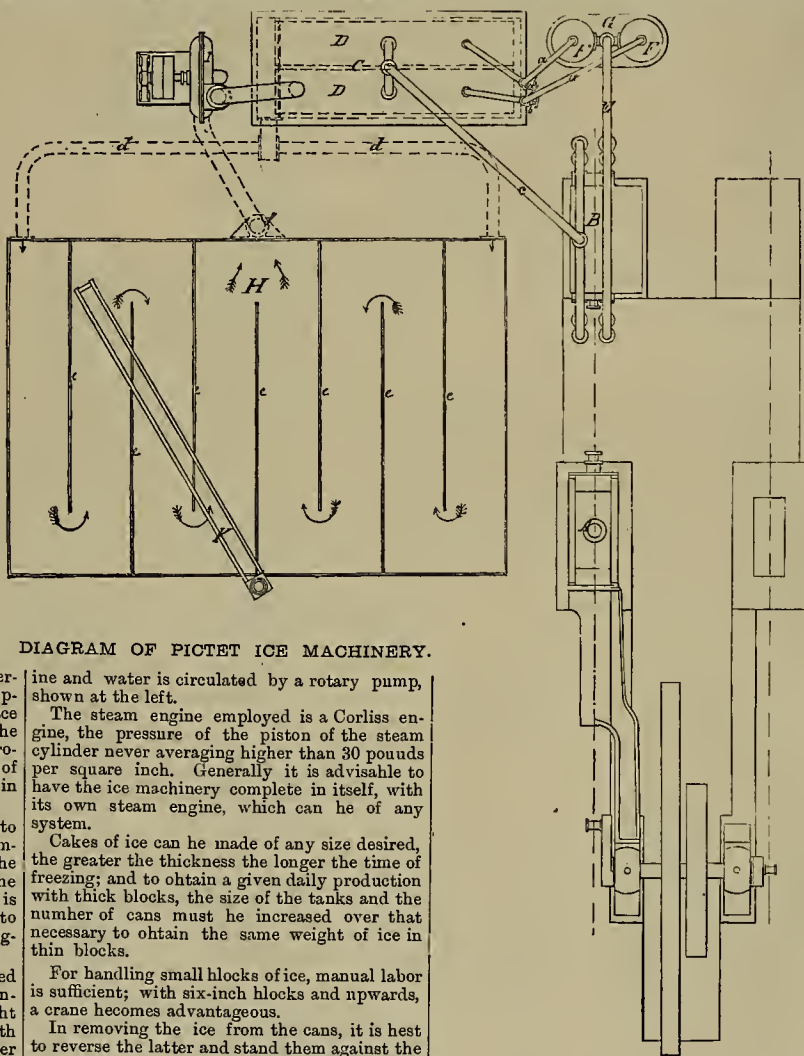


DIAGRAM OF PICTET ICE MACHINERY.

ine and water is circulated by a rotary pump, shown at the left.

The steam engine employed is a Corliss engine, the pressure of the piston of the steam cylinder never averaging higher than 30 pounds per square inch. Generally it is advisable to have the ice machinery complete in itself, with its own steam engine, which can be of any system.

Cakes of ice can be made of any size desired, the greater the thickness the longer the time of freezing; and to obtain a given daily production with thick blocks, the size of the tanks and the number of cans must be increased over that necessary to obtain the same weight of ice in thin blocks.

For handling small blocks of ice, manual labor is sufficient; with six-inch blocks and upwards, a crane becomes advantageous.

In removing the ice from the cans, it is best to reverse the latter and stand them against the wall; the heat of the room gradually loosens the ice from the sides of the can and it slides down. A more expeditious method is to lower the cans into a small water tank heated occasionally by a steam jet, but the waste of ice is increased.

The tanks containing the refrigerator and condenser are generally of iron, as well as the large tank containing the ice cans. The sides of the refrigerator tank and ice tank are isolated by sawdust, charcoal or mineral wool, between the iron and the outer wooden side.

Natural ice is frequently milky and snowy, but the ice obtained by artificial means is not only compact and solid, but it can be made absolutely transparent.

To obtain ice as clear as crystal, the patented process of Mr. Turettini, of the firm of Raoul Pictet & Co. is applied; the cost of production is increased only a few cents per ton, and the process can be adapted to any size of machine.

When buildings already exist, the disposition of the machinery is made to suit the same. It is preferable, however, to erect a special factory in which the machinery can be set to the best advantage, the boilers being placed in a separate room, isolated from the rest of the building, in order not to increase the temperature of the latter.

It is advisable to arrange an ice house adjoining the factory, in which to store a certain amount of ice. The ice house, or room used for that purpose, should have double walls or par-

ships carrying meats, fruits, etc., the freezing liquid, after leaving the refrigerator, is circulated in a tank containing a number of pipe coils, through which the air to be cooled is forced by a blower.

For skating rinks this system has come into extensive use; those who are familiar with these agreeable and exhilarating resorts will certainly rejoice that this invention makes them independent of all the caprices of the weather, and enables them to enjoy the pleasure of the rink even on the hottest summer day. Skating floors now used in England, the invention of Mr. John Gamgee, are formed of a number of flattened metallic tubes, placed side by side on a bed of concrete or asphalt. The interior of these tubes is kept filled with an uncongealable mixture of glycerine and water, which flows in from an elevated cistern, where it is cooled by machinery similar to that described above. The tubes are sprinkled with water spray, and after this is frozen, water is again sprinkled over it, until a smooth mirror of ice for skating is obtained.

As this invention is not yet fully developed, it is impossible to foretell what its capabilities are, and what impact it will give to progress in different manufactures and industries, but it seems destined to play an important part in the restoration of the commercial and industrial prosperity of this country.—*Polytechnic Review*.

Heat in the Lower Levels of the Savage Mine.

There is still one very hot place ahead in this mine. It is in the 2200 level. In approaching that point the heat will be so great in the incline that it will be almost beyond human endurance. It is now intensely hot below the 2100 level, but the heat will be very much greater before the 2200 level is drained. The heat and steam now ascending is only from the small surface of water exposed in the incline. The critical time will be when the water begins to fall away from the roofs of the long drifts and other openings on the 2200 level. Then the steam and heat rising from a great surface of water will move to the incline, up which it will rush in seething, blinding volume. At present the steam is kept back and only escapes from the comparatively small surface exposed in the incline. In approaching the 2000 level the workmen in the Savage experienced something of what will be seen at the 2200. As the water began to recede on the 2000 level a great amount of surface was exposed, from which rose a vast deal of steam and heat, all of which poured up the incline on its way to the surface. While the level was in this condition it became necessary to connect a pipe with the donkey pump. The men sent down to do this work several times advanced to the pump, but as often retreated, finding it impossible to face the scalding and blinding heat. They finally declared that there was no use in trying to make the connection—that no human being could face the heat. Being determined not to be beaten out of the incline, the foreman finally induced a man to go down the incline with him and assist in nailing a sheet of canvas across the compartment just below the point where the pump was standing. The canvas was nailed up and it served such good purpose in turning aside and shielding the men from the direct current of heat and steam that they were able to make the desired connection. While holding up the canvas to nail its upper corners the foreman had the back of the fingers of his left hand scalded to a blister. In approaching the 2200 level the same great heat will no doubt be encountered. It was not noticed at the 2100 level, as there were no large openings at that point; nothing but a station.—*Enterprise*.

Value of Alkali Soils.

Every State and Territory west of the Rocky mountains contains more or less alkali land, the aggregate in Utah and Nevada being very great. Where this salt is present in large quantity the soil in its natural state is wholly unproductive, and even the lands but slightly alkali have heretofore been considered nearly worthless. Prof. Hilgard, of the Agricultural Department of our State University, has been engaged for some time past analyzing the various soils found in California, paying especial attention to this class. The result of his investigations goes to show that the popular idea concerning alkali lands is at fault; that instead of being valueless, they in reality carry a large proportion of the richest fertilizing ingredients. For instance: The alkali soils in the vicinity of Stockton are found on an analyses to contain large quantities of phosphates. Soil from the alkali plains of Merced contains a large percentage of niter, an article which is shipped in large quantities from Chile and Peru. The alkali soil in the vicinity of Anaheim is again rich in potash. With the employment of gypsum as a neutralizer of the alkalies, Prof. Hilgard thinks these soils can be made the most productive in the State. In attempting to reclaim the more heavily alkali lands of Nevada and Utah more difficulty would, of course, be experienced than with the soils above mentioned, yet there is little doubt but even these can be rendered fit for tillage, and perhaps in their natural state would successfully grow certain kinds of vegetables.

A GUARD AGAINST OVERWINDING.—An apparatus to prevent the overwinding of hoisting cages was put in operation at the Crown Point mine last Sunday. It has proved a perfect success. It is the invention of Thomas Lane, the well-known engineer and machinist. It is very simple in construction, and there is nothing about it to get out of order. The hand of the dial does all the work of stopping the cage. When it moves round to the point which indicates that the cage is nearing the mouth of the shaft, the hand comes in contact with the end of a lever, which moves a second lever attached to the end of a rod which reaches to the engine, and there moves a third lever that gradually shuts off the steam and stops the machinery. We yesterday saw several trials made of the apparatus, and it never failed to shut off the steam and stop the engine at the proper point. At almost any other works on the lead there is more margin between the point to which a cage must be hoisted and the point that would crush it in the sheave, the distance being but about two and one-half feet. This is on account of the very low galloways-frame, and because of their having put on double-decker cages when their frame was intended for cages carrying only a single car. Although the trials we saw were made with empty cars on the cage—a test more severe than if the cars had been loaded—the cage always stopped at the proper time, though the engineer turned on a full head of steam and stepping back let the engine have its own way.

Sale of Government Timber Lands.

The bill prepared by Senator Sargent authorizing the sale of certain public timber lands, has been passed by the Senate, almost insuring its becoming a law. This bill provides that any surveyed lands in California, Oregon and Washington Territory, not reserved, and valuable chiefly for timber and unfit for cultivation, and which have not been offered for sale, may be sold in quantities not exceeding 160 acres to any one person or association at a minimum price of \$2.50 per acre; and that lands chiefly valuable for stone may be sold on the same terms. Nothing in this act is to impair any bona fide claim under any United States law, or authorize the sale of any mining claim or mineral lands, or interfere with the rights of ditch owners. Any person desiring to buy such lands is to make very much such an application and proof as to the character of the lands and its being vacant, etc., as in the case of mining land purchases. He is required to subscribe to a stringent oath that he buys for his own use and not for any other person. A provision is made for hearing all adverse claimants. Other sections of the bill made it unlawful to cut or destroy any timber on public lands with an intent to export or dispose of it, under a penalty of a fine of not less than \$100 nor more than \$1,000; but permission is given any miner or agriculturist to take such timber as is necessary in the ordinary working of his mining claim, or preparing his land for tillage, or in support of his improvements. Parties now being prosecuted in California, Oregon or in Washington Territory, excepting such as have cut timber for exportation, are to be released on payment of \$2.50 per acre for all lands from which they have taken timber. They are not, however, to acquire title to the land by the payment of the penalty, but will have the same rights as other persons to purchase under the provisions of this bill. The speedy passage of the bill, and especially of the last section, without opposition, was surprising, but was accounted for by the fullness of Sargent's explanation of the need for it when presenting the California memorial on the subject recently.

Renaming a Mountain.

The *Inyo Independent* says that Mr. Hutchings, of Yosemite valley fame, is preparing an exhaustive article upon the subject of the high Sierras, comprising the high peaks, their proper nomenclature and respective location which has caused so much discussion. He supports the name given the high peak by the Lone Pine fisherman, and in his report will give descriptions of all exploration, notices of discovery, etc. He quotes Lieut. Wheeler's data, according to which the height of Fisherman peak (or New Mount Whitney) is 14,448 feet. Old Mount Whitney—the peak which was so designated—lies about five miles to the south-east of Fisherman peak, and has an altitude of 14,094 feet above sea level, as determined by barometer.

We suggest that a more appropriate name than the one here mentioned be found for this noted peak if it is to be divested of its present name. It is all right that the name of Whitney he applied to the highest of these peaks as was the original intention; but wherefore call the other "Fisherman peak" in the event of its being relieved of its present name? Who ever fished upon it, or by what party of fishermen was it discovered, that it should be so designated? Rather let it for the present remain nameless than attach to it this seemingly senseless and unmeaning appellation.

COLORADO'S MINERAL BELT.—By consulting Lieut. Wheeler's new triangulation map, it will be seen that a line drawn through Silverton, at the southern extension, and Gold Hill, in the northern portion, will cut through the center of one of the largest mineral belts in the known world, and a particularly interesting feature is that boundary lines drawn on each side, at a distance of 15 miles from the center line, will take in every known quartz ledge in Colorado. Here then we have a belt about 30 miles wide, traversing the State in a northeast and southwest direction. Georgetown, Mt. Lincoln and Lake City lie directly in the center of the belt. Sunshine and Central City lie a little to the east of the center, Ward and Caribou a little to the west. All of the noted placer diggings also lie within this belt, although at points, like the Platte river at Denver, light float gold has been carried beyond its limits. These facts should prove of advantage to prospectors, as it is safe to say that the nearer the center of the belt the more likely will one be to get large hodies of ore.—*Sunshine Courier*.

THE MODOCOS.—These Indians located in the northeastern part of the State have advanced rapidly towards civilization since being placed on their reservation in 1873, and after this year they will be able to get along without assistance of any kind from the government. They now own 4,000 acres of land, on which they have built good houses, have fenced in and have under cultivation over eight acres to each person in the colony. They have 120 acres of wheat, 175 of corn, and 236 head of cattle, and have cut 140 tons of hay. Besides they have plenty of poultry, etc. Fifty-nine children attend school.

USEFUL INFORMATION.

Construction and Care of Tools.

A veteran mechanic writes for the *Railroad Gazette* some of his experience on the construction and care of the fine tools of the machine shop. He says: One class of lathes is made light, and although the workmanship may be first-rate, and everything about them handy and easy to handle, and quick to change from one job to another, they are still so constructed that they are short-lived, soon wear on the ways where most used; a great deal of tremendous polish with knick-knacks, sharp corners and cabinet-maker sofa-legged ogees. That sort of thing is an abomination in the eyes of Sir Joseph Whitworth, Sellers, Freeland and Moodna, of Orange county. Their plan is to make everything as plain as possible, with round corners and perfect workmanship. Bodmer, an ingenious Swiss, some thirty or forty years ago was in partnership with Birley, of Manchester, England. He was considered the most particular machinist in the world, and manufactured tools for his own use. His lathes were constructed something like Whitworth's, with conical steel journals in the lathe spindles, steel-hardened bushes ground on the same principle as Whitworth's templates, compound slide rests, etc. He would discharge a man for laying a hammer or a wrench on the bearers or shears. The consequence was that his tools after being in constant use for 13 or 14 years were in such excellent order that they sold for above their value when new.

My experience in some shops is the reverse of the above. Some 25 years since there was a splendid lathe came into a machine shop in Buffalo from Moodna, Orange county; 18-inch heads from the centers, with compound slide-rest. The fast head-stock was so constructed that the largest possible cone and wheel would swing, and a small pinion on the back-shaft. The cone probably made 16 revolutions for one of the spindle, thereby increasing the power enormously. There was a face-plate, as large in diameter as would swing, with four slots, and the rest square holes, very stiff; no spring to it. The following head-stock was in proportion: a splendid tool. A first-class workman was put on it, and after running it some years left it in good working order without a scratch. Afterward some cheap, inexperienced man got hold of it and made a total wreck of it.

In my opinion, if more attention was paid to power and stiffness and good wearing, long hearings in the construction of machinists' tools, and less to ornamental gingerbread flourishes and nonsensical sharp corners, they would give better satisfaction in the long run.

SOME FACTS ABOUT BREAD.—Professor F. de Chaumont, in the report of the French army medical department, gives the results of some investigations he has been making with regard to the weight and nutritive value of bread. One fact which he states might have been anticipated, namely, that the amount of crust has a good deal to do with the loss of moisture in cooling and subsequently. Where several loaves are baked in one mass, an inside loaf, with crust only at top and bottom, loses about three per cent in cooling; one with four sides crust loses two per cent; and one baked singly, with six sides crust, only about three-quarters of one per cent. The loss by drying afterwards is proportionally more rapid in the loaf with less crust; so that this becomes unpalatably dry much sooner than the loaf well walled in with crust. The amount of solid matter in crust is about 90%, in the crumb only about 63%. In bread of first-rate quality the crust should form 30% of the whole weight, but often it is little more than half as much. For army use, or wherever bread is to be kept for some time and transported for considerable distances, it is important that it be thoroughly baked. The amount of acidity in bread—a point of some interest, which has never before been definitely determined—has been investigated by Dr. de Chaumont. Taking a known quantity of bread, he digested it in a certain amount of water, and then treated it with standard alkaline solution. This process showed an amount of acidity equal to 4.06 grains of crystallized oxalic acid, or 3.55 grains of glacial acetic acid, for each pound of (fresh) bread—an estimate of acidity which may be provisionally adopted as the standard proportion.

OFFICIAL LABOR INQUIRY.—Secretary Evarts has sent a circular to all United States Consuls abroad, requesting reports on the following subjects: First, the price of labor among laborers of all classes; second, cost of living to laboring classes; third, comparison of the present cost of living and rates of wages with that for the last ten years; fourth, cost of produce and its market price; fifth, amount of paper money in circulation and its relative value to gold and silver, together with its fluctuations during as many years as can be accurately obtained, and the causes which have produced the fluctuation. Intelligent responses to these inquiries cannot fail to furnish a mass of valuable information bearing on social and economic questions. The result will be to show that in spite of hard times and other drawbacks the American people are better off than any other in the world, with less cause for complaint or political agitation.

The Influence of Surroundings.

The surroundings of the place of labor have more influence upon the operative than many are aware of. Give a workman clumsy tools to work with, a rough, dirty, hench to work upon, imperfect light, scarcely elbow room, and but little care exercised respecting proper ventilation and warmth, and he will become careless, his work partaking of the character of his surroundings; he will think more of his wages at a certain time than of the completion of his work. A few years of this experience will spoil almost any workman, no matter how good he may be. But give him, on the contrary, good tools to work with and an airy and agreeable place in which to perform work, and he will insensibly take more pains with it than in a badly arranged room. In a pleasant room he will, of his own accord, keep his tools and work in good order and more cheerfully perform the task assigned to him. A kind of magnetic influence of the surroundings will infuse itself into the operative, and his work will partake of that and go from him stamped with the impress of the influence thus created. This applies with equal force to the workshops in connection with many ironmongers' places of business. General repairing often carried on in rooms wretchedly lighted and ventilated, will do much to induce the workman to take less pains in turning out satisfactory work.

UTILIZING BITS OF SOAP.—Instead of throwing away the pieces of soap which become too small for convenient handling, make a square flannel bag of suitable size; leave one end partly open, and put in the pieces as they collect; when it is full baste up the opening, and it makes a nice bath-tub arrangement. Another way is to add a little water, set them in a tin on the stove, and let them simmer slowly. When cold, you will have tolerably good soft soap, just the thing for putting in your wash boiler or washing tins with. Or by evaporating part of the water you may get the soap hard enough to be molded into small cakes, which can be dried for use.

BURNING CHIMNEYS.—An exchange says that a burning chimney, when the soot has been lighted by a fire in the fire-place, can be extinguished by shutting all the doors in the room, so as to prevent any current of air up the chimney; then by throwing a few handfuls of common salt upon the fire in the grate or the hearth, the fire in the chimney will be immediately extinguished. The philosophy of this is that, in the process of burning the salt, muriatic-acid gas is evolved, which is a prompt extinguisher of fire.

GOOD HEALTH.

Dangers of a Chill.

The *Herald of Health* gives pointedly the results of cooling off too rapidly when one becomes heated by extra labor. It enumerates the following diseases as traceable to this cause: Rheumatism, consumption, Bright's disease, pneumonia, bronchitis, stiffness of the joints, dry neck, pleurisy, catarrh, etc. The following is the method of the evil: The coolness of the evening air is very refreshing to a laborer after a hard day's work in the hot sun, but it is as dangerous as it is agreeable. During the day his garments have probably been wet with perspiration, and if still damp or wet when the cool of the evening comes, he experiences a chilliness and arrest of further perspiration. The blood does not circulate freely near a chilled surface, and congestions or undue accumulations in internal organs are the consequences. From such congestions of important organs come arrest of secretion; the liver, for example, when engorged with blood, ceases to separate bile from the circulating fluids, and an attack of jaundice follows. Or congestion may occur in the respiratory organs, and pneumonia, bronchitis, or pleurisy may result. An arrest of the secretions of the skin or kidneys may terminate in inflammation of the joints, lumbago, sciatica, or some other rheumatic affection. Furthermore, the diarrheal affections so common in the summer season, are frequently caused by exposing the body to a cool current of air after having been heated, although they are usually ascribed to the eating of some food that is supposed to disagree with the digestive organs. While the latter is true in some cases, the most frequent cause is undue exposure of the body, especially at night, by going to sleep in front of an open window on a hot night, without sufficient covering, forgetting that it constantly becomes cooler toward morning; and so the surface of the body is chilled, and the blood retreating to the internal organs produces congestions that result in diarrhea, dysentery, etc.

The Detection of Sewer Gas.

The deadly poison which exhales from the sewers, and makes our city sleeping rooms breeders of fevers and diphtheria, is sometimes a difficult thing to detect. A writer in the *Manufacturer and Builder* says that the odor is not a safe criterion. In the first place, the sense of smell is so different in different individuals, that some will smell absolutely nothing while others do so very plainly; secondly, a bad odor may or may not be accompanied by injurious gases; thirdly, it is not known that the dangerous miasmatic germs floating in the

air of sewers or sewer gas have themselves any odor at all, or perhaps only a scarcely perceptible odor; so that they mix with air and can be inhaled without being at all perceived by the individuals exposed in localities subject to sewer communication. One of the most sensitive tests is a solution of permanganate of potash, which is of a brownish pink, and changes its color by the presence of organic bodies in the air to which the solution is exposed; at the same time it purifies the air. It is a substance very rich in oxygen, which it keeps loosely combined, and therefore easily gives off in a condition as active as ozone, and so oxidizes and destroys all germs it comes in contact with. We would recommend a disinfecting of the locality by often using an atomizing spray of this solution. It will even discolor in the air of an ordinary bedroom, but not so rapidly as when sewer gas or other injurious odors are present. Other disinfectants are bromalum, sulphate of iron, and carboic acid; they are all far superior to chlorine, which is a destructive agent, acting most powerfully on substances on which its action is not wanted, namely, on metallic objects—it ruins them, and produces such an offensive smell as to force people to open all doors and windows. Some go so far as to maintain that this is all the good it does. One thing is certain, that it is no protection against sewer gas. We will state in closing, that the time it takes for a solution of permanganate of potash to discolor gives a pretty fair estimate of the amount of impurities floating in the atmosphere when a flat dish containing it is exposed. You must first boil the water in which you dissolve it, because if you dissolve it in ordinary rain or well water this may contain impurities which will change the color, especially when the solution is much diluted. If it is well made and the air kept perfectly pure, it will not discolor soon, and the shortness of time is a warning of danger.

OVER-EATING.—If the food is wisely chosen there is not much danger of over-eating. Dr. Beard says: "It is a fallacy to suppose that people, as a rule, eat too much, and that most of the diseases of the world come from over-feeding. The truth is that among all decent or civilized people the tendency is directly the reverse. In this country, and especially in our large cities, far more are under-fed than over-fed. Throughout our land thousands and thousands die every year from actual starvation. Some of those unfortunates are little children whose parents are too ignorant or too poor to give them what is necessary to sustain life. But many of them are adults, whom hard poverty or sad ignorance has forced into a habit of systematic though undesigned starvation. Day after day the vital powers slowly fade, the strength grows less, the spirit becomes morbid, and the face wan and dejected. Disease now steps in, attacks and carries by force some important citadel of the body, and death follows. The process is a slow one—sometimes very slow—extending, perhaps over many years, but it is oftentimes as sure as it is slow. An injudicious choice of the kind of food, either from whim or avarice, may also produce results equivalent to starvation."

AN ANTIDOTE FOR STRYCHNINE.—An instance of the prompt and successful use of an antidote in a case of strychnine poisoning is circumstantially narrated in *Nature*. A favorite Skye terrier had accidentally obtained and eaten the poison, which was intended for mice. The amount taken by the dog was probably about a sixth of a grain. When found, the animal was rigid and apparently lifeless, except having an occasional spasm. The owner consulted authorities and found that a dose of chloral hydrate was the antidote prescribed in such cases. To kill a rabbit, 21 grains of the chloral is sufficient; the dog was twice the weight of the rabbit, and the owner of the terrier therefore proceeded to inject 45 grains of chloral (in solution) under its skin. About 15 minutes afterward, supposing the dog was dead, the owner applied his hoot to it, probably feeling a little disgusted with the result of his experiment. To his great surprise the terrier struggled to his feet. Shortly afterward it took some milk, and subsequently, though not for a while very lively, it seemed none the worse for its experience. The essential point in this treatment is that the dose of chloral should be strong enough to kill, otherwise it may not be sufficient to overcome the effects of the strychnine.

BRAIN STIMULANT.—The best possible thing for a man to do when he feels too weak to carry anything through is to go to bed and sleep as long as he can. This is the only recuperation of brain power, the only actual recuperation of brain force, because during sleep the brain is in a state of rest—in a condition to receive and appropriate particles of nutriment from the blood, which take the place of those which have been consumed by previous labor; since the very act of thinking burns up solid particles, as every turn of the wheel or screw of the steamer is [the result of consumption by fire of the fuel in the furnace. The supply of consumed brain substance can only be had from the nutritive particles in the blood, obtained from the food eaten previously, and the brain is so constituted that it can best receive and appropriate to itself those nutritive particles during the state of rest, of quiet, and stillness of sleep. Mere stimulants supply nothing in themselves; they goad the brain and force it to a greater consumption of its substance, until it is so exhausted that there is not power enough left to receive a supply.

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The Week.

The past has been to the people of this coast a generally auspicious week. For most kinds of labor there has been an increased demand, growing out of the advent of the hay-making season, and the near approach of the cereal harvest. In some parts of the State there has even been an insufficient supply of field hands to meet the wants of the farmers. The cool and lowering weather with a slight rainfall, has proved favorable to both our agricultural and mining interests, having tended to prevent the snow melting on the mountains, as well as a too rapid ripening of the grain and a drying up of the pasturage. The labor movement, while it continues to occupy the earnest attention of the working men in the larger towns, assumes every week a less threatening aspect; and there is little doubt but that it will take on a milder form when the grain harvest, now also at hand, shall have afforded remunerative employment for all who desire it. We have as yet had no strike for higher, or the retention of the old rates of wages, such as have occurred in the Eastern States and Europe, nor is that issue likely here to be made between the operatives and employers. With us it is a question of work rather than wages, the mildness of the climate, and the cheapness of most articles of subsistence enabling the laboring masses to maintain themselves comfortably on moderate earnings. We have here no long and severe winters to intermit employment, fuel costs but little, and the country is generally healthful. Real estate in the city shows a slight improvement, and building is a little more active, while orders are increasing at our foundries and machine shops.

What is Needed to Make Mining a More Perfect Success.

We see it stated by the press and often hear it said that the business of mining for gold and silver on this coast is likely to soon undergo a marked expansion; and such may be the case—it may be that this industry is destined to advance with quickened pace and spread rapidly into new regions. We think this will come to pass in the early future. But what we most need just now is the perfecting of better methods for the conduct of this business. We require to know how to carry it on properly and well rather than to multiply reduction works or extend the field of its operations. We have mines enough and in many localities mills enough, but we have not as yet succeeded in managing either with entire success. Heretofore in all large enterprises, more especially where managed by companies, failure has been the rule, success the exception; and until we shall be able to reverse this rule it can hardly be expected that capital will respond with much alacrity to our earnest appeals for further assistance.

It appals the economic mind to reflect on the money that has been lost in mining operations on this coast, and that apart from speculations in stocks. These Pacific States and Territories have been the graveyard of capital gathered from large and small investors all over the world. Thousands and tens of thousands have been impoverished, many utterly ruined through their contributions for the promotion of practical mining schemes set on foot here by all kinds of men. No class of society has escaped this tax. The poor man's savings and the rich man's wealth, the widow's mite and the miser's hoard have all been swept away into this fathomless abyss of expenditure, from which no dollar has ever been returned.

And yet in the face of these facts the miners in the interior complain and think it hard that they can no longer get money with the same facility as of old for opening up and outfitting their claims, always alleging, when reminded of these losses, that they now have properties about which there can be no mistake. Only furnish them the money and they will demonstrate their merit by producing results that will satisfy every one concerned. But this is exactly what has always been said. When this multitudinous array of investors adventured their means before, it was upon just such representations as these. There were the assurances of "the honest miner," the opinions of promoters, the returns of assayers and the reports of experts, all vouching for the richness and abundance of the ores, the favorable surroundings of the property and the large profits that must inevitably accrue from the proffered investment. Just as now, it was all right at the beginning, but, with the exception of the favored few, proved to be all wrong in the end.

The miner should remember these things; should bear in mind how hard investors have fared and not longer expect that he can dispose of claims for a good price or obtain aid for opening and equipping them without having first made such a showing of ore as will insure success beyond a reasonable contingency. If the value of his claim is merely prospective, parties furnishing means for its development may rightly exact an interest proportioned to the risk they run. Not a few are the instances where claim owners have, through persevering hard work, brought their properties into a self-sustaining condition, though aiming in the first instance to merely so develop them that moneyed men would be willing to take hold and help them through. These are examples that commend themselves to the attention of miners everywhere.

The owners of the Hackberry mine, in Arizona, have, under extremely adverse circumstances, worked that into a most valuable property, without any outside aid whatever. Simeon Wenban who, 14 years ago entered the Cortez district, Central Nevada, a very poor man, by sticking to it when all others left, enjoys now a daily net income of \$500. William Raymond went into the same region bare handed only a couple of years since, and, taking hold of a mine in a desert and nearly abandoned district, through good management, but without any pecuniary assistance from others, is once more a rich man. In the same vicinity are two or three other small companies, who, under nearly like conditions, are deriving handsome returns from ledges that years ago have been abandoned. But these were plucky men and hard workers. They did not run about looking for a big thing in sight, but started in on what seemed a fair prospect and then went ahead, without waiting for capital, or coming to San Francisco to incorporate a company and sell stock. While getting a start they not only worked hard, but managed closely and lived poorly, a course that every miner at the outset should be willing to adopt. Some of these successful men commenced with an arastra, then got in a five-stamp mill, which was afterwards increased to one of larger capacity. Others for a while at first selected their best ores and shipped them to market, putting up reduction works when they had, from the sale of their ores, realized enough money for that purpose, one of the lessons here inculcated being that the miner should be willing to commence operations on a small scale, extending the same only as his net earnings enable him to do so. A great fault

with, our miners is their eagerness to make a fortune at once—to take out a great deal of money before laying a proper foundation for doing so. If they will learn to repress this desire, cultivate patience, work hard and practice economy, they will sooner, as well as more surely, reach the end for which they are striving.

New Almaden and Guadalupe.

We had the pleasure of a short trip to New Almaden and Guadalupe, last week, and were glad to learn at the latter place that there have been some improvements there since our last visit. Of these, the Superintendent, the genial Mr. Thayer, promises us an account when they are completed. Work has been going on slowly but steadily at this mine, despite the bad state of the quicksilver market.

At Almaden we were pleased to see that the immense *tierra* furnace, for which the ground was broken a year ago, is almost completed. In fact, as we stood upon the top of it, there seemed but little left to do beside making the connection with the condensers. The furnace is a noble square prism, nearly 40 feet high. It is iron-clad throughout and is a fine piece of work.

In fact, we must admit that the furnaces at New Almaden are as well adapted to their purpose as furnaces can be. We think it would be very hard to suggest any improvement in the combination of apparatus used at this mine for the reduction of cinnabar. The furnaces work continuously. The ore leaves the furnace not only free from quicksilver, as we have proved by a careful chemical analysis, but as cool almost as it entered it. This secures an almost perfect utilization of the heat. In the next place the ore is charged and discharged and also moves through the furnace entirely by gravity. The arrangements for charging are such that there is no escape of the poisonous vapors of quicksilver. The iron coating which surrounds the furnace renders any such escape from its walls also simply impossible. Fine ore can be roasted as well as coarse. And, in fact, the whole arrangement is one of the best adaptations of scientific principles that we have seen on this coast, and speaks volumes for the intelligent management of the mine. Mr. Randal has promised us a description of the apparatus, and we hope to give the readers of the Press (at an early day) some further idea of one of the great improvements in metallurgy originating on this coast.

We noticed with pleasure some improvements in the offices both at the Hacienda and on Mine hill, and were glad to see things in such fine order. We understand there have been some improvements in their hoisting machinery at the mines, but we did not have time to examine these.

We hope to see the day when the arrangements for condensing quicksilver fumes shall be as simple and as effective as the means for producing them are at New Almaden. We do not think as do many others that the amount of quicksilver lost from the condensers is very great. Not only does an examination of the smoke and soot from the end flue of the Idria furnace in Austria seem to disprove this, but our own experiments seem to tend in the same direction. Last summer we had prepared some squares of gold foil. These were first exposed to the fumes of some of the condensers where quicksilver was depositing its vapors, in order to test their sensitiveness and they were instantly coated. Similar ones were then exposed for nearly a week (at the end of the apparatus), so that the escaping fumes might impinge upon them. There was not the slightest trace of amalgamation. These experiments would be decisive were it not for the presence of a certain amount of soot in the fumes. This may have formed an imperceptible film so as to protect the gold from the very dilute vapor.

It is not to their ineffectiveness, therefore, that we object, but to their cumbrous size, cost, etc. Mr. Thayer states that it took 6,000 flasks to saturate the walls of the old condensers at the Guadalupe before a single drop could be obtained from them. Rating quicksilver at 40 cents per pound, a flask of 75 pounds is worth \$30, and this makes \$180,000 worth of quicksilver which must remain as so much dead capital until these same condensers are pulled down.

Much has been done, in this direction, in devising improvements in New Almaden. In fact, their iron condenser and the condenser of wood and glass have done much to do away with the unwieldy and costly things of brick. But in this direction, difficult as it is, we believe there are possibilities for improvement, and we hope to be able to suggest some ideas on this subject at a future time.

SILVER TO BE A LEGAL TENDER IN SUMS OF TWENTY DOLLARS.—The bill passed by the House to discontinue the coinage of silver five-cent and three-cent pieces, contains a provision that may be of special advantage to the Pacific Coast, namely: "The present fractional or subsidiary silver coins shall hereafter be a legal tender in all sums not exceeding \$20 in full payment, and shall be taken up and legal tenders given in exchange for them when presented at the Treasury of the United States in sums of \$20 or over." It is presumed that this will authorize the exchange of greenbacks for subsidiary coin at the San Francisco Sub-Treasury; but if not, the clause can doubtless readily be amended in the Senate so as clearly to effect that desirable purpose.

Notices of Recent Patents.

Among the Patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

ROPE TRAMWAY.—Thos. H. Day, S. F. Mr. Day's invention relates to certain improvements in the construction of wire-rope tramways and apparatus. It consists in a novel construction of the tube within which the rope runs beneath the permanent way, so that it may be laid without cutting the cross-ties or sleepers, made much smaller than heretofore and very much more cheaply. It also consists in a means of detaching the grip from the rope and throwing it entirely out of the tube, so that the car may be made to cross another wire ropeway at any angle, or may be switched off upon a siding or transferred to another line of track at any point without the necessity of going to the full length of the line or to any special point on the line, where there is a turn-table or other apparatus for transferring the car or dummy. The peculiar apparatus employed for the purpose of making the connection between the car and rope and throwing the grip entirely out of the tube makes it possible for the inventor to run a line of cars in both directions with but a single line of track, and neither car, grip or any portion of the apparatus need be reversed in any manner.

SIDEWALK HATCHWAY.—Peter H. Jackson, S. F. This invention relates to certain improvements in that class of doors which are employed to close openings in sidewalks and other places where it is desired to have a door which shall be perfectly water-tight when closed and also level and flush, without any external projection, and it consists in a novel construction of hinges and also in the employment, in combination with the doors and frame, of a series of grooves or gutters, so placed as to catch any water which may enter through the joints around the outside or meeting edges and convey it off without allowing it to fall into the area or space below. It also consists in combining with the doors and their meeting edges of a combined bearing bar and gutter, said gutter being connected with those at the sides, so as to convey off all the water which may come in from any direction.

CONSTRUCTING WOOD SEWERS.—A. Herrmann and W. Sexton, San Jose. This covers an improved construction for wooden sewers and drains of all descriptions and consists in a novel method of forming and uniting boards, planks or timbers at right angles with the axis of the sewer, so as to bind them together in any desired shape to resist external and internal pressure, and so that any portion of it may be repaired from the interior without disturbing the surface of the street above. It is claimed that the method employed is a novel, cheap way to imitate the egg and circular shape of brick sewers without an elaborate frame with and without the help of either nails or iron, bolts, screws or hands; and that the pressure of the surrounding ground instead of weakening the structure makes it stronger and less liable to get out of order.

When He Was a Miner.

In his great speech on the silver bill, Senator Jones pronounced a glowing but well-deserved paucy upon the miners of this coast, declaring that he himself belonged to that class, having for years labored with the pick and shovel for a livelihood. It is a common practice with aspirants to public favor, this of proclaiming themselves laboring men for the sake of gaining popularity with the masses, some having recourse to it who have never performed a day of manual toil in their lives. With Jones, however, the claim is a well-founded one, he having been not only a practical miner, but having, at least on one occasion, worked for wages, as the following story, related by an eye-witness, tends to establish.

Jones, who came to California at an early day, after mining for two or three years in Tuolumne county, pulled up stakes and put out on a long tramp to the north, fetching up in Weaver Basin, Trinity county, his eschequer so depleted that he was obliged at once to find something to do. In this straight he hired out by the day to a Pike county bull puncher, who was running a string of sluices on Weaver creek. This Pike was a sour, grumpy sort of fellow, but our miner, thinking the alkali absorbed in crossing the plains might have counteracted the natural acerbity of his temper, was disposed to treat him with affability, extending to him, on all occasions, the common amenities of life.

After this had gone on for a short time, he, of the butternut jeans, determined to check what seemed to him such undue familiarities from an underling; wherefore, the future Senator, ceasing work for a moment and leaning on his shovel, as was his wont, bade him a cheery "good-morning," his employer, scowling, growled out, "look at here, young man, did I employ you to shovel dirt into that yar sluice or to stand thar on one leg and pass the compliments of the day with the boss?" According to the tradition, the relation of master and servant was the same evening severed between these parties.

The Manufacture of Dynamite, or Giant Powder in England.

A decision has recently been rendered in the English Supreme Court of Judicature, in the case of The British Dynamite Company vs. Messrs. Krebs & Co.

This was a suit originally brought by the plaintiff company against the defendants, Messrs. Krebs Brothers & Co., of Cologne (who are manufacturers of the explosive compound lithofracture), and against their agents in England, for an infringement of the patent in this country. The patent on which the plaintiffs relied, and which they complained was being infringed by the manufacture and sale of lithofracture, was taken out in 1867. The cause was heard before Mr. Justice Fry in June last year, when his Lordship held that the defendants had to some extent made use of the plaintiffs' invention, and that the plaintiffs were, therefore, entitled to an injunction, with an account of the profits.

On the appeal, the Attorney-General, Mr. Macrory, and Mr. Fielding Nalder appeared for the appellants, and Mr. Aston, Q. C., Mr. E. Cutler, and Mr. Chester for the Dynamite Company. The Attorney-General opened the proceedings on behalf of Messrs. Krebs & Co., praying a reversal of the judgment of the Court below, on the grounds that the instructions contained in the patent of 1867 were insufficient, and that the claim was too wide; that it was, in fact, what is known as a roving patent.

Mr. Aston then proceeded to argue the case for the Dynamite Company. At the conclusion of the learned counsel's arguments on the second day of the hearing, the Master of the Rolls, without calling on the Attorney-General to reply, said, that although, on the one hand, a Judge must not be astute to defeat a patent, yet, on the other, he must not extend a patent so as to cover that which was not then discovered. The question here was whether the alleged discovery was reduced to that form and described in such terms that a competent workman taking the specification into his hands would be able to manufacture the article, the subject of the patent, without any experiment. In his opinion in all these respects the specification failed in complying with the necessary conditions, the instructions were insufficient, and the claim was too wide, and he thought the order of the Court below should be discharged, and the bill dismissed with costs.

Lord Justices James and Thesiger concurred. They thought that on both points the judgment of the Court was wrong, and the appeal must be allowed.

An Assay Outfit for One Hundred Dollars.

We are constantly in receipt of numerous inquiries as to the amount of apparatus necessary to fit up a small assay establishment from miners and others in remote parts who wish to be able to know something about the contents of our ores, and we have made some investigations in this direction for the benefit of such of our readers as may need such information.

Messrs. John Taylor & Co., of 512 and 518 Washington street have been kind enough to give us a list of apparatus and chemicals which will be sufficient to make all the assays of gold, silver, and lead, which they say can be furnished for \$100. The list is as follows:

1 assay balance, with weights from 10 to 1-100 grains. Gramme sets will be supplied if desired. 1 pulp scale, with weights from one ounce Troy to one grain. 1 10-inch furnace, iron lined with fire-brick. 1 muffle. 1 pair crucible tongs. 1 pair scorifier tongs. 1 pair cupel tongs. 1 cupel mold. 1 assay mold. 1 quadruple ingot mold. 1 dozen assay crucibles. 1 dozen scorifiers. One-quarter dozen crucible corers. 1 one-half gallon iron mortar and pestle. One-half dozen annealing cups. 1 Nest (16) porcelain evaporating dishes. 1 dozen test-tubes. 1 rack for test-tubes. 1 dozen matrasses. 1 glass spirit lamp and wicking. 1 brass blow-pipe. 1 nest (4) beakers. 1 wash bottle with handle. 1 four-inch glass funnel. 1 brass sieve, No. 60. One-half dozen assorted test papers. 1 package filters. 1 four-inch steel spatula. 1 wire tripod. 1 steel hammer. 1 polished anvil. 1 pair flat pliers. 1 pound chem. pure nitric acid. 1 pound chem. pure sulphuric acid. 1 pound chem. pure muriatic acid. 10 pounds bi-carbonate soda. 5 pounds litharge. 10 pounds bone ash. 5 pounds borax. 2 pounds refined niter. 1 pound carbonate potassa. 1 pound fused cyanide potassa. 1 pound sulphuret of iron. 5 pounds bar lead, pure. 1 pound FFF ammonia. 1 pound black flux. One-half ounce proof silver. 1 pound pure granulated lead. 1 pound pure rolled lead.

This outfit we are confident would enable many a miner and prospector with a little experience to do much of his own assaying, especially in such remote places as make it difficult to have it done by competent parties except by waiting for some time. And at any rate we hope the information will not come amiss, and we hope at some future time to give our readers some further information as to the state of our chemical manufacturing and importing industries, that they may know where to go for what they want.

The opium smoking vice has got a firm foothold in Sutter Creek, Amador county.

Thomas Edison and the Phonograph.

We take occasion in this week's PRESS to inform our readers of the recent advances which have been made in the mechanical transmission and recording of vocal sounds. In our issue of last week we gave an account of the development of the telephone. Our task at this moment is to describe a still more startling achievement of genius, and that is a successful record and reproduction of human speech by a simple machine called the phonograph. We shall speak first of the man who has accomplished the achievement, and second of the machine itself.

In 1847 Thomas Edison was born in Ohio.

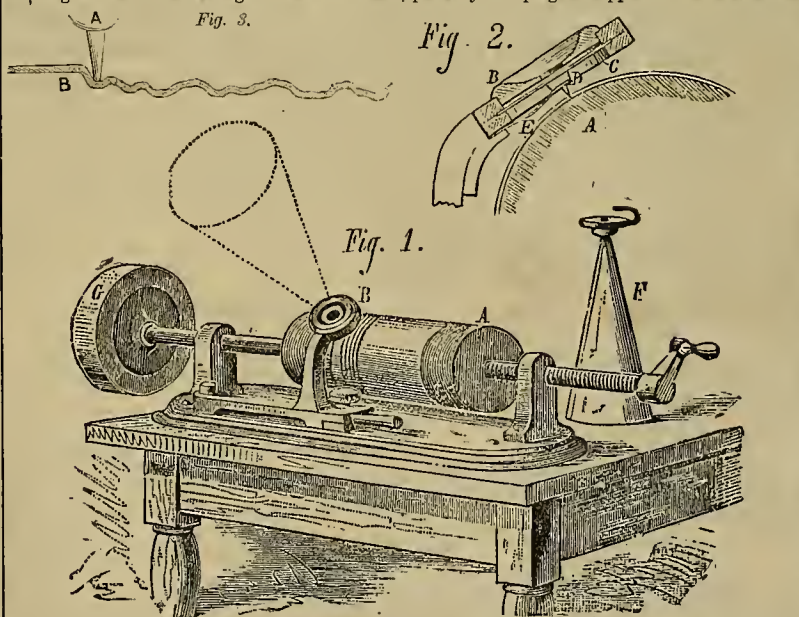


THOMAS EDISON—Inventor of Telephone and Phonograph.

When he was eight years of age his parents moved to Michigan, and young Edison began life as a newsboy. He was a driving newsboy. At 13 years of age he obtained a contract for the exclusive sale of newspapers on one of the largest Canadian railways, and had a squad of boys working under him. While he was still running on the trains he began chemical stud-

and reproducing the human voice and won a world-wide fame.

The phonograph is regarded as the greatest triumph of inventive genius which has been attained even in this inventive age. It is greatest in its achievement and peerless in its simplicity. The engraving on this page shows all its parts, and from these it appears that there is nothing intricate in its mechanism. It consists, as shown in Fig. 1, of a brass spirally-grooved cylinder, *A*, mounted on a long, horizontal screw, the cylinder being rotated and at the same time moved laterally by turning a crank at the end of its shaft. The chief part of the apparatus is the diaphragm, marked *B*, in Fig. 1, and shown in detail of its parts in Fig. 2. At *C* is shown the thin plate of metal held by its edges, so that it can vibrate, and at *D* is a fine needle or stylus, which is attached to the



THE PHONOGRAPH WITH SECTIONAL VIEW OF DIAPHRAGM.

ies, fitting up a traveling laboratory to take with him on the cars. Then he became a telegraph operator, and soon afterwards stood at the head of the craft. He celebrated his 20th year by conceiving the idea of sending two messages over the same wire at the same time, thus doubling the capacity of all previous systems of telegraphy. For the last ten years he has pursued his electrical studies and inventions, working with surprising swiftness and exceeding zeal, until at length he has succeeded in recording

instrument. When this has been properly done, the stylus, *D*, should lightly press against that part of the foil over the groove. The crank is now turned, while, at the same time, some one speaks into the mouth-piece of the instrument, which will cause the diaphragm to vibrate, and as the vibrations of the latter correspond with the movements of the air producing them, the soft and yielding foil will become marked along the line of the groove by a series of indentations of different depths (Fig. 3),

varying with the amplitude of the vibrations of the diaphragm; or, in other words, with the inflections or modulations of the speaker's voice. These inflections may therefore be looked upon as a sort of visible speech, which, in fact, they really are. If now the diaphragm is removed, by loosening the clamp, and the cylinder then turned back to the starting point, we have only to replace the diaphragm and turn in the same direction as at first, to hear repeated all that has been spoken into the mouth-piece of the apparatus; the stylus, by this means, being caused to traverse its former path, and consequently, rising and falling with the depressions in the foil, its motion is communicated to the diaphragm, and thence through the intervening air to the ear, where the sensation of sound is produced.

The method in which the stylus indents the tin-foil is shown in magnified form in Fig. 3, *A* being the stylus and *B* the cross section of the tin-foil. In reality the marks left by the stylus are very fine. As the sheet of tin-foil is taken from the cylinder it is grooved with parallel grooves about 14 to the inch. In each groove there are the indentations of the stylus, quite regular in size to the naked eye and about 50 of them to the inch.

The Phonograph at the Grand Musical Festival.

The phonograph admits of many applications. The tin-foil sheet having recorded speech in one place may be taken from the cylinder and sent thousands of miles, and being placed in another phonograph will reproduce the words and actual tone of voice originally imparted to it. This will probably be fully shown at the coming Musical Festival in this city. For some time past Manager Bugbee has been endeavoring to secure a phonograph for the purpose of giving a public exhibition of its wonderful performances at the first day of the Festival. Samuel Hubbard, the agent in this city, has received a dispatch stating that the phonograph will be promptly forwarded—also the tin-foil impressions of warblings by Miss Kellogg, Miss Cary or Rudersoff and a greeting from Rev. Henry Ward Beecher, for the purpose of reproducing them through the aid of the phonograph at the Festival. Carl Zerrahn, the director, brought with him tin-foil impression of "Yankee Doodle."

In an article in the *North American Review* Mr. Edison indicates what are its probable applications. We may expect before a year is ended to have it ready for use in correspondence. The principle can be applied to every implement or toy which makes a sound. A clock may speak the hours, instead of striking them. A child's doll next Christmas day may utter the moral precepts which we put in our children's copy-books. The locomotive approaching a crossing may screech out: "Look out for the engine!" or it may cry out the name of the station it is approaching, because Mr. Edison believes he can intensify sounds as well as reproduce them as they are committed to the instrument. He says that he can in time make the machine talk so loudly that it can be used on vessels to warn off other ships during fogs, and his last astonishing proposal is that he shall construct a huge phonograph to go in the great bronze statue of Liberty which is to be erected in New York harbor, so that the metal giant can make a speech audible over the entire bay. In view of what Mr. Edison has already accomplished, his success in this respect would not surprise us.

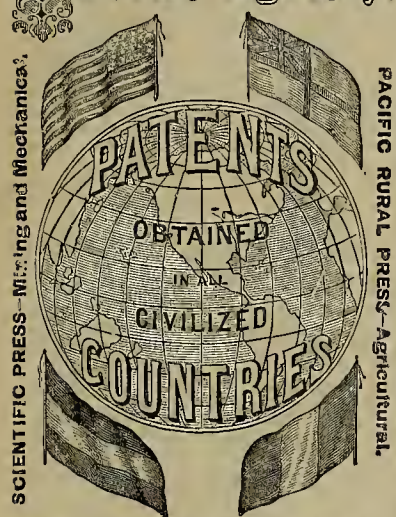
THE TELEPHONE IN OUR OFFICE.—We propose to avail ourselves of the advantages of the inventive triumphs which we describe in this issue. We shall soon have telephonic communication between our business office and our editorial and composing rooms, which are a number of blocks distant from each other. Any reader who may desire to inspect the actual working of the instrument, is welcome to come and try it for himself. The telephone will afford us momentary speaking connection with 100 or more of the leading business-firms in this city through the "central system," which we described last week. We have confidence that this "central system" established by the American District Telegraph Co., at their office No. 222 Sansome street, will prove an important step in the advancement of the city's business interests, and will also result in increasing the usefulness of the PRESS to its patrons.

PLACING OUR LOAN.—The Syndicate has decided to take the remaining 15,000,000 of the 50,000,000 of 4½% bonds covered by its contract with the Secretary of the Treasury. The options for October, November and December are thus anticipated. A large part of the 15,000,000 will be sold abroad. It is asserted that the Syndicate is discussing the question of entering into a contract with Secretary Sherman for 50,000,000 4% bonds, with the option of taking 50,000,000 more.

DISBANDING OF THE DIO LEWIS PARTY.—According to intelligence from San Jose, the Dio Lewis camping party will disband. Two small parties proceed to the Yosemite. Others return to their homes. The doctor's sickness is most unfortunate, as he has lost money on the enterprise. His agents show every disposition to accord justice to all.

THE rock in the bottom of the Combination shaft at Virginia City is growing softer, and the water is fast increasing. They are now hoisting 36,400 gallons per day, whereas, until recently, the quantity hoisted was but about 16,000 gallons per day.

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From A Patentee.

HUNSAKER, TULARE CO., CAL., Jan. 15, 1878.
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A. L. HUNSAKER.
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TO QUERISTS.

In propounding questions to the editorial, patent or business departments of this office, letter writers should be careful to enclose a stamp and addressed envelope if they wish prompt answer. If we were to furnish time, paper, envelopes and stamps, all free to parties who address this office on matters of more interest to themselves than to us, FIVE HUNDRED DOLLARS A YEAR would not cover the expense. This hint, however, is not intended for parties writing in our own or the public interest, or who would be obliged to delay writing at any time for want of an extra stamp.

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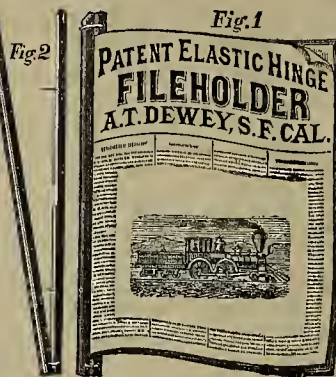
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Are offered for sale in Reading, situated on the Sacramento River, at the present terminus of the railroad. It is the converging and distributing point for large, prosperous mining and agricultural districts in Northern California and Southern Oregon. Also, lots in the town of Anderson, situated more centrally on the ranch. Lots in both these towns are offered at a bargain, for the purpose of building up the towns and facilitating settlement of the ranch.

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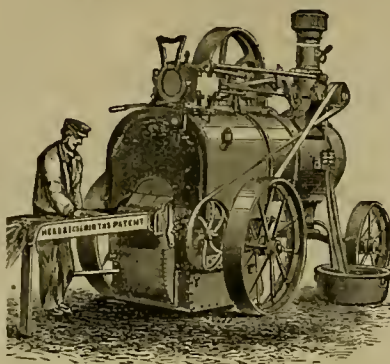
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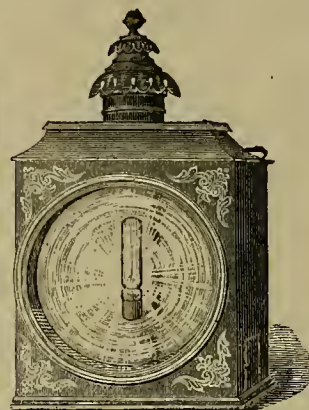
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They never have to be taken off the mandrel, and will stand up square in edging any stock, which makes them indispensable for gange.

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Copp's Hand-Book of Mining Laws.

Henry N. Copp's hand-book of mining laws, just issued, contains the United States mining laws and instructions thereunder, a digest of decisions, forms, list of mining patents issued, etc. The digest of decisions alone is a very valuable thing, giving, as it does, in brief form, all the decisions of the Secretary of the Interior and Commissioner of the General Land Office in relation to mining matters. These are all under proper headings for easy reference. Forms are given for notice of location, proof of labor, notice of forfeiture, miners' lien, application for survey, patent, etc., affidavit of improvements, etc. There is also a list of patents issued for mining claims from July 20th, 1866, to August 1st, 1877. The book is of pocket size and very convenient for all who are interested in mines. It will be sent post-paid for \$1, on application to Dewey & Co., 202 Sansome street, San Francisco.

THE CLIMATE OF CALIFORNIA.

A thoroughly studied and ably written treatise on this subject by Hon. B. B. Redding, appears complete in the Pacific Rural Press for January 26th, and also the Mining and Scientific Press. Based upon facts, figures and careful and extensive observations made in various parts of the State on this important subject, it is a volume of reliable information, interesting to every resident of the State. The information is condensed in a paper read before the California Academy of Sciences, and is published in the Press as read before that Society without any alterations or omissions. Extra copies, post-paid, 10 cents. Address DEWEY & CO., Publishers, 202 Sansome Street, San Francisco.

25 Fashionable Cards, no two alike, with name, 10c. postpaid. OEO. I. REED & CO., Nassau, N. Y.

Continued from page 325.

TUSCARORA DISTRICT.

THE GRAND PRIZE.—*Silver State*, May 18: This company shipped west yesterday, 27 bars of bullion, valued at \$46,447. This is the largest shipment ever made at one time from the mine, and if we are correctly informed it is the last that will be made for some time. That the mine has been gutted for a purpose by the management is not doubted by those who have had opportunity to observe the manner in which it was worked. The vast deposits of rich ore above the water level were extracted to send up the stock, so that insiders could dispose of it at a handsome figure, and no effort was made to prospect the mine below water level until those ore bodies were exhausted, to enable the insiders to buy back their stock at one-eighth of the price they sold it for. It is putting it mildly to call those responsible for this state of affairs swindlers. It is crookedness of this kind practiced by Directors and Superintendents, who form a ring to cheat stockholders, that brings mining into disrepute and causes the business to be classed with gambling.

WARD DISTRICT.

PAYMASTER.—*Reflex*, May 18: Judging from what we saw lately in the clay chamber of this mine it is not excelled by more than one mine in the State. From side to side it is all of 60 feet wide, possibly more, but how far it may extend along the lode no one pretends to know. From the level of the tunnel this body of ore has been raised upon almost to the grass roots. The entire mass it is thought will average \$75 a ton, and a large percentage will go from \$300 to \$500 to the ton. It is claimed that the greater portion of this ore can be milled to advantage, which we can readily believe on account of the presence of antimony. There are those who still propound the question: "does this body of ore go down?" We suppose it does.

MUNCY CREEK MINE.—Ned Brannan has opened up a ledge on Muncy creek that promises great returns upon further development. His work thus far has been done on the surface, but a shaft is now being sunk on the ledge. As we have said before, it is expected the ledge will prove 60 feet thick. It has already been opened up to a width of over 30 feet, on the surface it shows much more. Mr. Brannan could now supply, he says, a 20-stamp mill with ore, from which he has had assays all the way from \$60 to \$1,300 to the ton.

Arizona.

THE PIMA COUNTRY.—*Sentinel*, May 18: The news from this section of the Territory is encouraging. There is great activity in mining matters, and the country is full of prospectors and of parties operating for men of money. Cattle and sheep have done so very well for so many seasons in succession, that stock-ranges are being rapidly occupied. Farming is stimulated by the mining developments. Increasing prosperity and peace in Sonora are swelling the trade of Pima merchants. Mills and machinery have already been contracted for, and will soon be taken out there. Public confidence in security against Indians is completely restored, and the country is so rapidly settling up that renewal of Apache hostilities will soon be impossible.

MINERAL HILL.—*Citizen*, May 10: This camp, situated in Globe district, though recently settled is one of great promise. Milner and Watson got from the Silver Era and Etna mines 13 tons of ore which gave them 6,700 ounces of silver. They have increased their gang of men and have secured as superintendent Mr. Palmer, a thoroughly competent man. The Etna is about 20 feet deep and shows a body of chloride ore three feet wide. The Silver Era has over two feet of ledge matter and is richer than the Etna. At three feet from the surface the Julius shows a four-inch streak of ore; at 20 feet, the present depth, it shows nearly four feet. In is a chloride ore with a liberal showing of ruby and virgin silver. I was there the other day just as a blast went off, and masses of ore weighing over 200 pounds were thrown out. They have over 12 tons of ore out, which will average considerably over \$100 to the ton. That is the product of 30 days labor for one man. The Green Tree mine, the Mayflower, the Kanuck, Whalen's, Marco's, and all the mines and prospects along the hill to Bixby's are showing well and will soon take rank with the best of them.

Colorado.

THE MELVINA.—*Sunshine Courier*, May 11: Henry Nelkirk received a check last night for \$6,797.46, that being the amount paid by the Boston & Colorado Smelting company for 16 tons of ore obtained from the Melvina mine of Boulder county in the month of April. The profits for the month were over \$6,000, or about 80 per cent. The shaft is now 330 feet deep and the mine is supplied with steam hoisting works. Nine men are employed below and one at the engine and mouth of the shaft. The yield of the Melvina for the first four months of 1878 was 60½ tons selling for \$31,830.46, with a net profit of over \$24,000. The assay value of the ore for the four months exceeded \$35,000, and in the 34 months since the mine was first opened \$175,000. A few tons were concentrations.

Dakota.

DEADWOOD.—*Times*, May 4: The way things look now, Deadwood will soon be in the very heart of the mining district of this section of the Hills. Nearly all the rich leads and pay

streaks struck this spring, are located immediately southeast and northwest of this city.

ELIZABETHTOWN.—This place is bound to make a good camp yet. New placer and quartz mines are being discovered all around it. Some good claims have just been opened, we are informed, up Spring creek, a small stream which puts into that camp from the west.

PROSPECTING AND ASSAYING.—Assayer Davis informs us that a large number of specimens of quartz are being brought in to be assayed. These specimens come from all parts of the Hills, showing that the work of prospecting is being carried on to a much greater extent than the average citizen has any idea of. Much of the rock betrays big prospects.

News in Brief.

The rains have materially damaged crops in Florida.

MINNESOTA proposes to sow 6,000 acres of sorghum this year.

JOE COBURN, the pugilist, is laying brick in the prison at Auburn, N. Y.

MANY complaints are being made against the opium-smoking dens in Virginia City.

A FIFTY-THREE pound salmon has been caught in Monterey bay, with a hook and line.

THE Oakland and Bantas railroad is nearly completed, and will soon be open for business.

OAKLEY HALL'S legal practice is now confined to the Police courts.

TEN THOUSAND orange trees have been planted in the vicinity of San Jose this spring.

TENNESSEE has twice as many acres in wheat as she had last year.

MANY complaints are being made in Virginia City against the opium-smoking dens.

THE revival among the colored folks of Richmond, Va., is still in full blast.

LARGE quantities of live stock are daily arriving in the mountains from their winter quarters in the lower valleys.

JOHN DIMON has been committed to the Napa Insane Asylum. He is 55 years of age, a native of Ireland, and a tailor by trade.

LEVI WURTZ, who resided on Plumb creek, Colorado, was struck dead by lightning last week.

BAKER & HAMILTON'S extensive plow factory, at San Leandro, gives employment to about 100 white men.

JAMES G. FAIR, of the Bonanza firm, has bought, for \$5,000, Toby Rosenthal's painting, "The Seminary Alarmed."

THE Manchester operatives have consented to a 10% reduction of wages, the cotton masters will reopen their mills immediately.

GENERAL FREMONT is now very poor, his household goods having lately been sold by the sheriff.

THE triplets born in this city in February last are still alive, but do not seem to be growing very vigorously.

AT Wasatch Station, Utah, a train ran into a hand-car containing four men, instantly killing James King, the section foreman.

NINE boys at the Los Angeles high school have been suspended for smoking within the grounds.

SHEEP growers in Colorado have fixed the maximum price of sheep shearing at six cents a head.

DON RAFAEL CASTRO, a pioneer, died at Aptos, May 14th, aged 78 years. In 1838 he was Alcalde of Santa Cruz.

A HEAVY frost throughout Wisconsin, Ohio, Iowa and Indiana has seriously damaged fruit, vegetables, etc.

CHINAMEN, to the number of about 200, are working small vegetable farms in the vicinity of Melrose, San Leandro and Haywards.

"HAPPY JACK" is in the County Jail, serving out a term of three months for violating the saloon ordinance.

A VEIN of coal has been discovered about 10 miles west of Napa, which promises to turn out well.

A SCHOONER is being loaded at Santa Monica with 300 tons of asphaltum, taken from the Brea rancho, and intended for San Francisco.

A METHODIST Conference in Connecticut has decided to admit no more ministers who use tobacco.

MORRISSEY'S last political campaign is said to have cost him \$40,000. It really cost him his life.

CLEAR LAKE is reported as fairly alive with black fish, which are killed by hundreds every day.

THE fossilized fragment of a thigh bone of monstrous size has just been dug up near Santa Rosa.

Good harvest hands are in demand in the farming districts of the State at from \$30 to \$40 per month with board.

At the Merced woolen mills the machinery is in place and in successful operation, manufacturing blankets and other goods.

C. C. MILTON, of Cottoneva, Mendocino county, was drowned a few days ago while working on the chute at that point.

At Fall River, Massachusetts, last week, 20,000 mill operatives marched in procession. One of the banners carried bore this inscription: "If cheap labor be the basis of all prosperity, why is China not the head of civilization?"

JOHN H. BURKE has brought a suit in the Twelfth District Court in this city, against the Bonanza firm, and the directors of the Con. Virginia Mining Company, to recover in equity, the sum of \$35,000,000, alleged to have been withheld and misappropriated by them as the agents of the company.

Six men were killed by an explosion of gas in the Sidney mines, Halifax, three days ago.

THE bill for the repression of Socialist excesses has been submitted to the German Parliament.

THE recent earthquake at Cura, Venezuela, killed 600 persons. Heavy shocks were felt at Caracas.

NEARLY 150 persons have been arrested at Warsaw, Russia, as accomplices of the Nihilist Secret Association, recently discovered.

THE infamous divorce business is being carried on in Salt Lake through the Probate Court to as great an extent as ever.

MRS. MARGARY WATSON, of this city, has obtained a judgment of \$5,000 against Frederick Powell for breach of promise of marriage.

THE dead body of Cy Dubois, a well-known horse trainer of San Jose, was found in a creek last week near Gilroy.

THE grain crop of Stanislaus county will be the largest this year of any heretofore harvested. It is estimated at between four and five million bushels.

ABOUT the middle of the week it rained heavily from two to six hours in various parts of the State, damaging the crops in some places, and benefiting them in others.

AT Martinez on the 20th inst., Louis Kamp shot Jose Rais Berryessa, a desperate character, through the heart while the latter was advancing on him in a threatening manner.

GEO. W. ABBOTT, the money-broker, who ran away with \$40,000 belonging to the Anglo-Californian Bank, has been examined by the Commissioners of Insanity.

WHILE an iron girder of the New York elevated railroad was being hoisted in position a chain gave way and the girder fell to the ground, fatally injuring two men.

HENRY BUSSE has been committed to the Napa Insane Asylum. He thought he must live 40 days without eating, on religious grounds.

SHAD are said to be plentiful in the Sacramento river, but are not caught because the salmon nets are so large as to permit of their getting through the meshes.

A HEAVY wind and rain storm passed over St. Louis on the 18th inst., doing great damage to property and badly injuring a number of persons.

THE Petaluma *Courier* says there will not be over half a crop of wheat, barley and oats in Sonoma and Napa counties, on account of the prevalence of rust.

THE Utes are fast becoming civilized. One of them bought an umbrella at Ouray, which was shortly after stolen by another member of the tribe.

PEOPLE along the Labrador coast are starving, the fisheries having failed. The flesh of dogs is eaten, and many people have already starved to death.

THE Canadians on the border are greatly excited over the threatened Fenian invasion. The militia have been supplied with arms and gone into camp.

THE *Bay City*, a side-wheel steamer, intended to run on the ferry route between this city and Alameda, was successfully launched last Saturday at the rolling mills.

FRACO FISHER, a two-year-old boy living on the Gilroy road 12 miles from San Jose, was killed by the discharge of a pistol which his 11-year-old brother was playing with.

A COMMUNISTIC society in Parkersburg, Va., has between 500 and 600 members. It is officered and drilled. The members are reticent and the meetings are secret. Other societies exist in the State.

A BRISK shower fell in Colusa county on the 19th inst., followed by thunder and lightning. In the evening of the same day there was a six-hour rain in Los Angeles, also a slight rain during the night in San Francisco.

JOSEPH DAVIS has been arrested for alleged malfeasance in connection with the affairs of the Dime Savings Bank which recently failed in Sacramento, causing a total loss to the depositors, mostly boys and girls and very poor persons.

THERE seems little disposition among the Manchester strikers to accept the 10% reduction even temporarily. The spinners declare they would accept a 5% reduction outright, and nothing more. This action will prolong the strife indefinitely.

A PASSING vessel lately picked up, 200 miles off the Brazilian coast, a man on a raft in an exhausted condition, he having been there 10 days. His companion died after being on the raft four days and was washed overboard and devoured by the sharks.

THE steamship, *California*, built for Goodall, Perkins & Co., of San Francisco, and just launched at Philadelphia, has been sold to the Russian Government for \$500,000, the builders paying this firm \$100,000 to be released from their contract, and agreeing to lay the keel of a similar ship at once. The *California* is very fast, and is to be armed by her new owner.

THE Truckee and Steamboat Springs Company of Reno, Nevada, have awarded a contract for digging a new canal to a Chinese company for \$36,000—\$500 less than the lowest white bidder. A public meeting has been called to protest against employing the "heathen Chinese."

H. R. W. CLARK, a lawyer of San Francisco, was shot on his ranch in Ignacio valley on the 19th inst., by his son Frederick Clark, by the accidental discharge of a breech-loading gun, which he was carrying in a careless manner. The shot carried away one of the son's fingers, and the father's wound is fatal.

Trial of the New Fire Steamer.

[Written for the PRESS.]

Some two years ago, when the necessity for a fire steamer for protecting the vessels and water front property was acknowledged and advocated in the city, the Press published considerable information in connection with the subject, and gave a diagram of plans of the most improved fire launch in use in the East and Europe. The plan then described was shortly afterwards awarded the premium voted by the Fire and Water Committee of the Board of Supervisors, of which Mr. Lynch was acting chairman. The necessary appropriations to build and equip the boat, although urged by the Mayor, Chief of the Fire Department and leading shipping merchants, were not made for lack of funds. The fires at the bonded warehouse, and lumber wharves adjoining the Pacific Mail docks, showed too clearly the mistake of leaving this class of property unprotected.

That which the city did not do for its own interests, the State Harbor Commissioners have done for the interest of both land and water, and the *Governor Irwin*, the first fire steamer built and equipped on the Pacific coast, is the result.

The trial of this boat on the 16th inst. proved the following facts in connection with this last achievement in engineering. The pumps, to which of course the chief attention is directed, were of the well known Hooker pattern, manufactured by W. T. Garratt & Co. They were so modified and improved on the ordinary design as to come up to the standard requisite for fire service on the water front. The dimensions are as follows: Steam cylinders 15½ inches diameter by 24-inch stroke; water cylinders nine inches diameter by two feet stroke, with gun metal lining. The test, as far as it goes, is satisfactory, but for the public use and information further tests and information desirable may be pointed out. The main point of the trial was to test the ability of the fire-boat in supplying one or two fire engines with water through 1,000 feet or more of hose, in case at any time water should give out in the vicinity of a fire and near the bay. Several tests were made, all of them of a highly successful character, proving what a valuable adjunct the fire-boat will be to the Fire Department. The first test was throwing eight streams through 1,200 feet of hose with an inch and a half nozzle. It required the full force of the boat, with the addition of about 35 men from the department, to hold these pipes while throwing the water. The streams were thrown a distance of over 200 feet. The second test was with what is known as the Siamese attachment. The eight streams were combined into four, with the attachment on each, the nozzles being one inch and three-quarters. The streams thrown by this combination were of a most powerful character. The third test was through 2,000 feet of hose, with an inch and one-quarter pipe. This stream was thrown over 400 feet. It is claimed that the boat can supply a steamer through 2,000 feet of hose; the steamer would be able, through another 1,000 feet, to throw a stream from the bay up to Kearny street. An opinion in which all agree is that the manufacturers of the pumping machinery have furnished work which is a gratification to all experts who have examined it.

It should, however, be proved by experiment the exact time required to get up steam. The draft of water should also be compared with the minimum at the wharves (under three feet at low water). Again, how long can the pumps act continuously, and what are the general facilities for taking the vessel from a state of inaction into immediate service for a lengthened period. As the jets were thrown over the waters of the bay, no accurate distance could be shown, but it would be well to determine the exact capacity by a vertical stream in connection with a building, that judgment may at once be furnished for settling its most effective position in connection with such points as it may be required to protect. Also, its ability and power, in steaming out to some of the large grain vessels, and the reach of the jets compared with the masts and decks. If the long hose of 2,000 feet were run ashore and tested by flushing the sewers south of Kearny street, it might result in some valuable suggestions on that important question, and prove the loss of force by friction in passing through the hose. It would be well to call the fire launch into action on, say one of the bonded warehouses, at low water, so that a reliable opinion might be formed on its real use and efficiency. In this manner any imperfection would be found out and not left until a fire shows by dearly bought experience what should have been done. This fire launch is among the most valuable improvements and additions made to the engineering department of the Pacific coast during 1878. Pressure and vacuum gauges attached to the air chamber, would prove valuable indicators of the duty and condition of the pumping machinery in action. As doubtless in time every harbor on this coast will see the advisability of possessing a similar protection, a further public test would give experts an opportunity to gain exact information on a subject of great general importance.—J. HEBURN, Engineer.

JOHN LARSEY, a French Canadian, 56 years old, committed suicide at Brooklyn, Alameda county. He was formerly an interpreter in the San Francisco Police Court.

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING, MAY 7TH.

ROPE TRAMWAYS AND APPARATUS.—Thos. H. Day, S. F.
STEAM BOILER FURNACES.—Joseph Enright, San Jose, and John L. Heald, Vallejo, Cal.
STRAW-BURNING FURNACES.—Cofran I. Hall, Vallejo, Cal.
HEATING AND VENTILATING CHIMNEYS.—Jeremiah Brownell, S. F.
LASTS.—Joseph E. Chenette, Hillsborough, Oregon.
CONSTRUCTION OF WOODEN SEWERS.—Adolph T. Herrmann and Wm. Sexton, San Jose, Cal.
SIDEWALK HATCHWAY AND DOOR.—Peter H. Jackson, S. F.
TRACK CLEARERS.—George Royal, Truckee, Cal.

RE-ISSUES.

JOINTS FOR SHEET METAL PIPES.—Joseph Moore, S. F.
STEREOSCOPES.—Charles H. Wheeler, S. F., and James A. Bazin, of Canton, Mass.

TRADE-MARKS.

CANNED MEATS AND FISH.—J. G. Megler, Brookfield, Washington Territory.
CIGARS, CIGARETTES, SMOKING AND CHEWING TOBACCO.—J. D. Culp & Co., S. F.
INSECT-DESTROYING POWDER.—Giovanni N. Milco, Stockton, Cal.
CANNED MEAT, FISH, FRUIT AND VEGETABLES.—Fitzpatrick, Davis & Co., Fisherton, Washington Territory.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.
NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

MINING, A LEGITIMATE PURSUIT.—The frequency with which we hear the advocates of mining assert that it is a legitimate pursuit implies, of course, that there are those who maintain the converse of this proposition. If it were alleged that this business is sometimes illegitimately conducted, none would question the truth of the allegation; but it certainly sounds odd to hear one call in question the legitimacy of mining as a business. This comes from people confounding the manner in which a pursuit is sometimes carried on with the pursuit itself. But the two should be segregated in the mind as they are widely separated in fact. Mining is often perverted to speculative purposes or managed in a very unlawful way. Men also speculate in wheat, wool, meat, etc., and yet it would be absurd to seriously talk about farming, stock-raising or wool-growing being a legitimate sort of calling. They are wholly legitimate notwithstanding these abuses occupying the same industrial status as gold and silver mining. Mining for the precious and useful metals better measures a nation's advancement than any other standard. That people who have made greatest progress in these is the furthest advanced in civilization and enlightenment. Some comparatively barbarous races raise grain and cattle, but only those who have arrived at the highest development engage much in mining, which is not only a legitimate pursuit, but is the one on which all great attainments are mainly dependent.

CHROME IRON.—We understand that considerable chrome-iron is found in the mountains about here, but that nothing thus far has been done with it. Dr. Stillwagon informs us that there is now stopping in Napa City a man who has come from Scotland for the purpose of purchasing, if possible, a mine of chrome-iron; the mineral to be exported to Scotland. Any person possessing information regarding the location of lands on which the mineral is found will do well to look after the matter.

EXCESSIVE PRODUCTION.—The petroleum industry in Pennsylvania is said to be overdone. The daily production of oil is over 40,000 barrels, while the total consumption of the world is estimated at only 25,000 barrels per day. If such an excess of supply over demand should exist for any length of time, it could not fail to financially cripple all engaged in the business and prove especially disastrous to the petroleum interest on this coast.

The extensive beds of gypsum recently discovered in the mountains of Los Angeles county will prove to be very useful and valuable, as the alkali lands can be made eminently productive by the application of this neutralizer of alkali.

MAJOR HANCOCK, of the Brea ranch, is shipping a cargo of 300 tons of asphaltum to San Francisco. The schooner is being loaded at Santa Monica.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

BUENA VISTA M. Co.—May 21st. Capital stock, \$10,000,000. Directors—J. C. Van Ness, W. H. Whiteley, Clinton Givence, A. F. Williams and E. B. Clement.
BIG FLAT G. M. Co.—May 20th. Capital stock, \$10,000,000. Directors—Oscar W. La Grange, Aquilla W. Hanna, Alexander B. Barnard, Charles B. Kendall and Benjamin C. Jackson.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Modoc, May 13th, \$4,685.24; Grand Prize, 17th, \$46,100; Raymond & Ely, 12th, \$4,740; Northern Belle, 13th, \$2,205.15; Tybo Con., 13th, \$8,707.71; Justice, 17th, \$6,600; Independence, 18th, \$16,800; California, 18th, \$132,543.49; Con. Virginia, 18th, \$57,440.63; Northern Belle, 15th, \$3,257.50; Hussey, 20th, \$3,024; Tybo Con., 17th, \$12,554.63; Christy, 21st, \$5,454; Star, 21st, \$6,178; Raymond & Ely, 16th, \$3,917.84.

The new Savage steel wire cable is two and one-fourth inches in diameter, and 4,000 feet long.

Woodward's Gardens were never more attractive than at present. A fine lion and two lionesses, all young and not fully grown, have just been added. Balloon ascensions by Prof. Martin are now being made. The popularity of the gardens continues to increase. Rates of admission unchanged.

BATES' ADVERTISING AGENCY.—Mr. J. H. Bates, lately senior partner in the newspaper advertising firm of Bates & Locke, at No. 34 Park Row, having succeeded to the business of the firm, has rented and fitted up rooms in the Times building, No. 41 Park Row, New York city. Mr. Bates is one of the oldest advertising agents in New York city, having been in the business for a great many years.

SETTLERS and others wishing good farming lands for sure crops, are referred to Mr. Edward Frisbie, of Anderson, Shasta County, Cal., who has some 15,000 acres for sale in the Upper Sacramento Valley. His advertisement appears from time to time in this paper.

HAND PRINTING PRESS WANTED.—Parties having a second hand Washington or other hand printing press which they wish to dispose of, will please address this office, stating price, size and condition.

MODEL MAKER AND MACHINIST.—I. A. Heald, No. 514 Commercial St., San Francisco, (fourth floor).

ANY PHOTOGRAPHERS having a large Camera Box for sale will please notify "N. S." at this office.

METALS.

[WHOLESALE.]

WEDNESDAY, M., May 22, 1878.

IRON.—		
American Pig, ton.	28 00	30 00
Scotch Pig, ton.	28 00	30 00
White Pig, ton.	28 00	30 00
Oregon Pig, ton.	—	—
Refined Bar.	—	—
Horse Shoes, keg.	5 00	—
Nail Rod.	—	33
Norway, Oval.	—	72
COPPER.—		
Sheathing, lb.	14 00	35
Sheeting, Yellow.	22 00	—
Sheathing, Old Yellow.	24 00	—
Composition Nails.	24 00	—
Composition Bolts.	24 00	—
STEEL.—		
English Cast, lb.	13 00	14
Anderson & Woods, ordinary sizes.	15 00	—
Drill.	15 00	—
Flat Bar.	14 00	19
Flow Steel.	84 00	121
TIN PLATES.		
10x14 1/2 C. Bareal.	7 50	8 50
Banca Tin.	23 00	24
Australian.	17 00	17 1/2
ZINC.		
By the Case.	9 00	—
Zinc Sheet 7x3 ft, 7 to 10, lb.	9 00	10
7x3 ft, 11 to 14.	10 00	—
8x4 ft, 8 to 10.	11 00	—
8x4 ft, 11 to 16.	11 00	—
NAILS.—		
Assorted sizes.	3 15	25
QUICKSILVER.—		
By the lb.	43 00	45

LEATHER.

[WHOLESALE.]

WEDNESDAY M., May 22, 1878.

Sole Leather, heavy, lb.	22 00	23
10 lb. do.	20 00	21
Joket, 5 Kil, doz.	48 00	50 60
11 to 13 Kil.	65 00	67 00
14 to 19 Kil.	80 00	82 00
Second Choice, 11 to 16 Kil.	65 00	67 00
Cordillan, 12 to 16 Kil.	65 00	67 00
Females, 12 to 13 Kil.	63 00	67 00
14 to 16 Kil.	71 00	76 00
Simon Ulmo, Females, 12 to 13 Kil.	58 00	62 50
Eastern Calf for Backs, lb.	1 00	1 25
16 to 17 Kil.	72 00	74 00
Simon, 18 Kil.	61 00	63 00
20 Kil.	65 00	67 00
Robert Calf, 7 and 9 Kil.	35 00	40 00
Kips, French, lb.	1 00	1 35
Cal. doz.	40 00	45 00
French Sheep, all colors.	8 00	10 00
Eastern Calf for Backs, lb.	1 00	1 25
Sheep Roans for Topping, all colors.	9 00	13 00
For Linings.	5 50	10 50
Cal. Russet Sheep Linings.	1 75	4 00
Boot Lugs, French Calf, pair.	4 00	4 50
Good French Calf.	4 00	4 50
Best Jodot Calf.	5 00	5 25
Leather, Harness, lb.	35 00	38
Fair Bridle, doz.	48 00	72 00
Skinning, lb.	33 00	37
Wet doz.	30 00	50 00
Buff, ft.	18 00	20
Wax Side.	17 00	18

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, May 22, 3 P. M.
LEGAL TENDERS in S. F., 11 A. M., 99@87 1/2. SILVER, 2@2.20
GOLD in New York 100%
GOLD BARS, 890@910. SILVER BARS, 8@15 cent. dis.
count.
EXCHANGE on New York, 1/2; on London bankers, 49@49 1/2.
Commercial, 50; Paris, five francs 50 dollar; Mexican dollars, 94.
LONDON Consols 95 11/16; Bonds, 105 1/2.
QUICKSILVER in S. F., by the flask, 3 lb. 46@47 1/2.

GENERAL MERCHANDISE.

[WHOLESALE.]

WEDNESDAY M., May 22, 1878.

BAGS.—Jobbing.		
Eng Standard Wheat, 114@115		
Nerlie & Co's		
Hand Sewed, 22x36, 11@113		
24x36		
23x40		
Machine Sewed, 22x36, 11@110		
Flour Sacks, halves		
Quarters		
Eightths		
Hessian, 50 ineb.		
45 ineb.		
40 ineb.		
Wool Sacks		
Hand Sewed, 34 lb.		
4 lb. do.		
Machine Sewed		
Standard Gunnies		
Bean Bags		
CANLES.		
Crystal Wax		
Eagle		
Patent Sperm		
CANNED GOODS.		
Assorted Pie Fruits		
24 b cans.		
Table do.		
Jams and Jellies		
Pickles, bf gal.		
Sardines, qr box.		
Hi Boxes		
Preserved		
2 lb. doz.		
do Beef, 4 lb. doz.		
Preserved Mutton		
2 lb. doz.		
Beef Tongue		
Preserved Ham		
2 lb. doz.		
Deviled Ham, 1 lb.		
doz.		
do Ham, 4 lb. doz.		
COAL.—Jobbing.		
Australian, ton.		
Coos Bay		
Bonanza		
Seattle		
Cumberland		
Mr Diablo		
Lehigh		
Liverpool		
West Hartley		
Scotch		
Scranton		
Yankee		
Charcoal, sack		
Coke, hbl.		
COFFEE.		
Sanwich Id, lb.		
Costa Rica		
Gustamala		
Java		
Manila		
Ground, in cs.		
FISH.		
Sard Dry Cod.		
do in cases		
Eastern Cod		
Salmon, blbs.		
Hf blbs.		
2 lb cans.		
Pick Cod, blbs.		
Hf blbs.		
Mackerel, No. 1		
Hf blbs.		
In Kits		
Ex 24 cans		
Pkld Herring, bx 30		
Boston Smk Hg 40		
LIME, Etc.		
Lime, Sta Cruz		
hbl.		
Cement, Rosen		
Portland		
PAINTS.		
Plaster, Golden		
Gate Mills		
Land Plaster		
Assorted sizes, keg		
OILS.		
Pacific Glue Co's		
Neatsfoot No. 1		
Castor No. 1		
do No. 2		
Baker's A. A.		
Olive, Flagnol.		
Fossil		
Paint, lb.		
Linseed, Raw, bbl.		
Boiled		
Cocount.		
China nut, cs.		
Sperm		
Coast Whales		
Polar, refined		
Lard		
Olus		
Devils Bril.		
Photolite		
Nonpareil		
Eureka		
Cocount		
Downer Ker.		
Elaine		
PAINTS.		
Pure White Lead		
Whiting		
Putty		
Chalk		
Paris White		
Ochre		
Vermilion Red		
Averil		
Paint, gal.		
White & tints.		
Green, Blue &		
Ch Yellow		
Light Red		
Metallic Roof.		
RICE.		
China No. 1, lb.		
Hawaiian		
Cal. Bay, ton.		
Common		
Carmen Id.		
Liverpool fine		
Castile, lb.		
Common brands		
Fancy brands		
SPICES.		
Cloves, lb.		
Cardamom		
Nutmegs		
Pepper Grain		
Pimento		
Mustard, Cal.		
1 lb glass		
SUGAR, ETC.		
Cal. Cube, lb.		
Powdered		
Fine crushed		
Unmulated		
Golden		
Cal. Syrup, kgs.		
Hawaiian Molasses		
TEA.		
Young Hyson		
Ex 24 cans		
Country pkld Gunpowder & Imperial		
Hyson		
Force-Chow		
Japan, 1st quality		
2d quality		

Signal Service Meteorological Report.

Week Ending May 21, 1878.

HIGHEST AND LOWEST BAROMETER.

May 15	May 16	May 17	May 18	May 19	May 20	May 21
30.01	29.04	29.06	29.95	29.85	29.75	29.07
29.02	29.86	29.89	29.83	29.60	29.68	29.97

MINIMUM AND MAXIMUM THERMOMETER.

63	67	67	62	61	64	62
62	57	57	50	50	52	62

NRAN DAILY HUMIDITY.

67	52	53	72	70	72	72
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PREVAILING WIND.

W	W	SW	W	W	SW	SW
108	208	271	230	404	211	134

STATE OF WEATHER.

Clear	Clear	Fair	Fair	Cloudy	Cloudy
1	1	1	1	1	1

RAINFALL IN TWENTY-FOUR HOURS.

0.00	0.00	0.00	0.00	0.00	0.00
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Total rain during the season, from July 1, 1877, 36.15 in.

UNITED STATES

Mineral Land Laws, Revised Statutes, AND INSTRUCTIONS AND FORMS UNDER THE SAME.

We have just issued a pamphlet containing the General Mineral Land Laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with Instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1866; Mining Statute of July 9th, 1870. Forms required under Mining Act of May 10th, 1872, as follows: Certificate of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Registers' Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Charge of Fees; Proof of Ownership and Possession in Case of Loss or absence of Mining Recorder; Mineral Certificate; Certificate that no Suit is Pending; Power of Attorney; Protest and Adverse Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, post free, for 50 cents. It should be in the hands of every one having any mining interests. DEWEY & CO., Publishers of the MINING AND SCIENTIFIC PRESS, S. F.

TESTING AND WORKING SILVER ORES.—This is the title of an illustrated work of 114 pages, for Miners and Prospectors, by Chas. H. Aaron, published by Dewey & Co. It is written for miners, or plain language, and with all necessary details in description. The author describes the different processes of roasting ores, the appliances, methods of testing ores, testing for a process, working samples, treatment of base metals, use of chemicals, leaching processes, different kinds of crushing apparatus, etc. This little work abounds with useful hints to miners and prospectors, and is written in a practical style. Price, post free \$2.00. Address Dewey & Co. Mining and Scientific Press, 224 Sansome St., San Francisco.

To Mining Secretaries.

An amendment to Section 336 of the California Code, taking effect July 1st, 1874, provides that in addition to the regular publication, daily or weekly, of the assessment and sale notices as heretofore.

PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where he principal office of the Corporation is situated."

The above refers to the ASSESSMENT NOTICE only. Advertisers in the MINING AND SCIENTIFIC PRESS will be furnished with copies of assessment notices printed on slips suitable for serving personal notice under this law at short notice.

DEWEY & CO., Publishers.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

California Fruit Growing Association.

Principal place of business, San Francisco. Location of property, El Dorado County, Cal.
Notice is hereby given, that at a meeting of the Board of Directors, held on the third day of May, 1878, an assessment (No. 8), of three (\$3) dollars per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the Company, (64) Sacramento Street, San Francisco, Cal.

Iron and Machine Works.

HOS. PENDERGAST.

HENRY S. SMITH.

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS**and MACHINERY**

OF ALL KINDS.

Fremont Street, bet. Howard and Folsom,

SAN FRANCISCO.

**PHELPS
MANUFACTURING COMPANY,**

Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

13, 15 & 17 Drumm St., near California,

SAN FRANCISCO, CAL.

SACRAMENTO BOILER WORKS,

214 to 218 BEALE STREET,

HALL & KELSHAW,

PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the lowest possible terms.

GOLDEN STATE & MINERS' IRON WORKS.

Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

American Machine

AND



Experimental and Fine Special Machinery, Planing and Gear Cutting, Printing Press, Band Instrument and General Machine Repairing; Dies, Taps, Punches, Reamers and other Tools made to order. Models and Patterns for Inventors promptly executed in Wood or Metals. 514 Commercial Street, between Sansome and Leidesdorff, (Third Floor), San Francisco, Cal.

I. A. HEALD, Proprietor.

UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets, SACRAMENTO, CAL.

California Machine Works,

119 Beale St., San Francisco.

BIRCH, ARGALL & CO.,

BUILDERS OF QUARTZ, SAW AND FLOUR MILLS, STEAM AND HYDRAULIC ELEVATORS.

Sole manufacturers of Brodie's Patent Rock Crushers and Steel Faced Tappets, and General Machinists.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

J. HENDY, 49 and 51 Fremont Street, S. F.

THOMAS THOMPSON.

THORNTON THOMPSON.

**THOMPSON BROTHERS,
EUREKA FOUNDRY,**

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

GEORGE W. PRESCOTT.

IRVING M. SCOTT.

H. T. SCOTT.

UNION IRON WORKS.

Office, 61 First St. | Cor. First & Mission Sts., S. F. | P. O. Box, 2128.

BUILDERS OF

Steam, Air and Hydraulic Machinery.

Home Industry.—All Work Tested and Guaranteed

VERTICAL ENGINES,
HORIZONTAL ENGINES,
AUTOMATIC CUT-OFF ENGINES,
COMPOUND CONDENSING ENGINES,
SHAFTING,BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
PULLEYS,STAMPS,
PANS,
SETTLERS,
RETORTS,
ETC., ETC.

TRY OUR MAKE, CHEAPEST AND BEST IN USE.

Send for Late Circulars

PRESCOTT, SCOTT & CO.

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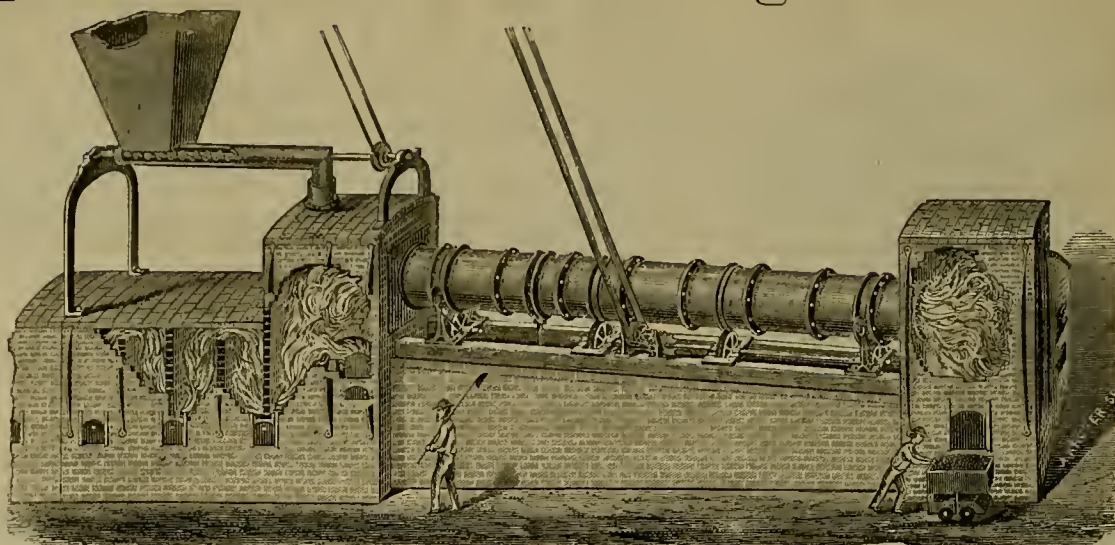
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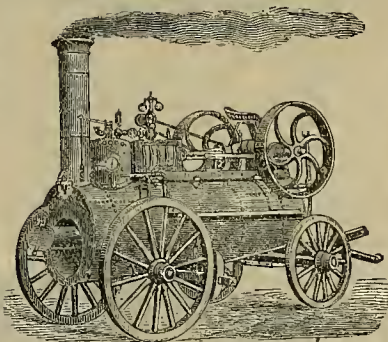
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SAN FRANCISCO, SATURDAY, JUNE 1, 1878.

VOLUME XXXVI.
Number 22.

A Hint to Sulphur Men.

Prof. Hilgard, of the University of California, recently suggested, in the columns of the *Rural Press*, the use of bisulphide of carbon for the destruction of ground squirrels. It had been successfully used in the sewers of Paris for the extermination of rats, and from the reports we have had, it seems equally useful in its new mission. The great objection to its use is the cost. The present prices of the purified article is 40 cents a pound. The crude article imported in bulk from the nearest manufactory, St. Louis, costs 25 cents a pound. Now, it seems to us that if this remedy proves to be what it claims to be, that it would be a great saving to the farmer and a profitable thing to our owners of sulphur fields if the article were manufactured here.

For this reason we give a short account of the properties of the substance and the best way of manufacturing it. Bisulphide of carbon is, as its name indicates, composed of one atom of carbon and two of sulphur. Its formula is CS_2 . It contains 15.8% of carbon and 84.2% of sulphur. At the ordinary temperature of the air it is a clear, colorless liquid with high refractive power and an agreeable ethereal odor (when pure). It is heavier than water, its specific gravity being about 1.27 at 59° F. (15° C.) On this account it is easily kept from evaporation and loss by covering it with a layer of water. Its boiling point is variously stated as being from 104° F. to 112.4° F. (40° to 80° C.). It is volatile at the ordinary pressure and temperature, even to a greater extent than ordinary ether, and the vapor is very inflammable. Carbonic acid and sulphurous acid are formed by its combustion. Mixed with air the vapor forms an explosive mixture. Even the pure vapor is an anæsthetic as powerful as chloroform, but the crude vapor, containing many other substances, and possessing, by the way, a very disagreeable odor, is a powerful poison, especially to all the lower animals. It has also the property of dissolving large quantities of the fats, oils, rubber, wax, camphor, sulphur, phosphorus, iodine, etc. So much for a rapid review of its properties.

Its Manufacture

It is easily attempted on a small scale by the apparatus shown in Fig. 1 of the accompanying engraving. A small furnace is inclined, as in the figure, and an iron tube as a gun barrel, or a glazed porcelain tube is placed in it. The end, *b*, is fastened by a lute tightly to the adapter, *c*, and the upper end is capable of being stopped by a tight cork. This tube is filled with coarsely powdered charcoal and the furnace is put in operation. When the contents of the tube have arrived at a good red heat, a small lump of sulphur is dropped in at *a*, and the aperture is then closed. The vessel, *d*, should be partly filled with ice water and the cooler filled with ice. No rubber should be used in making connections. The gas will soon appear and condense to drops, which soon sink beneath the water. This product is the crude substance. It contains sulphur, sulphydric acid and other things in solution, which give it a very disagreeable odor. It is purified by shaking with carbonate of soda or quicklime and redistilling.

Such an apparatus is not adapted to manufacture any large quantity, and we take the following description of an apparatus better adapted to the purpose from *Dingler's Journal*, 120, 192, to which we refer for further details. See Fig. 2.

A cylinder of cast iron, *A*, six feet high, one foot in diameter and a little more than two inches thick, is taken and carefully covered within and without with a lute of clay. This rests on a massive cast-iron block, *B*, and is surrounded by masonry. The cover of the cylinder is provided with two short tubes, *E* and *E'*, in one of which a porcelain tube is fastened, which runs to within three or four inches of the bottom. It rests here upon a layer of hard coke. The remainder of the space is then filled, through *E'*, with porous charcoal, and it is thus replenished as often as necessary during the operation. At the side, at *H*, is cast a short tube, serving to conduct off the vapors of the bisulphide. This has tightly fitting to it, by

cement, a tube, *I*, which conveys the vapor to the halloon of stone ware, *J*, where it partly condenses. This runs at will into a vessel, *L*, where it sinks beneath the surface of water, until it rises to the level of the siphon tube, *M*, when it flows into the jar, *O*, and is drawn off at pleasure. The vapors which are not condensed pass off through the glazed earthenware tube, *P*, then into the worm, *Q*, and the condensed liquid out at *R* into the jar, *S*, where it is drawn off as it fills. As the substance is very volatile, a constant circulation of water must be kept up in the condenser, the cold water entering at *U* and the hot running off at *T*.

The operation proceeds in this wise: The cylinder, *A*, being full of porous charcoal, it is heated up to a good red heat and small lumps of sulphur are dropped into *E* from time to time. As the charcoal is consumed it is added

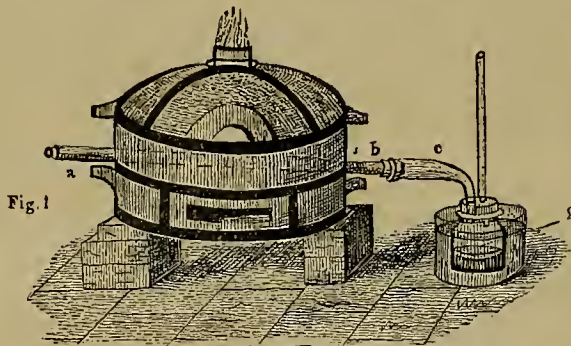


FIG. 1. SIMPLE APPARATUS FOR MAKING THE BISULPHIDE.

through *E'*, but time is given, after adding a charge, to let the charcoal become heated up to redness before more sulphur is added. This is to avoid the distillation of sulphur with the bisulphide as much as possible. The charcoal is kept in excess to avoid this also.

Such an apparatus as is here described is said to distill daily 250 pounds of the bisulphide. It is usual to work only during the day time and to leave a low fire on during the night, without any addition of sulphur. The chief item of expense would be the consumption of cylinders, as one lasts only from five to eight days, being attacked by the sulphur. A fusible sulphide of iron is formed, which, of course, destroys the vessel.

Supposing the article to bring 25 cents per pound, we should have for a production of 25

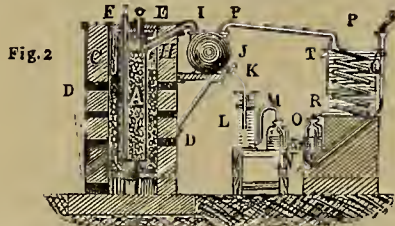


FIG. 2. APPARATUS FOR WORK ON A LARGE SCALE.

pounds, \$62.50 for a day's work, which, supposing a market, would certainly allow the price to run down to 12 cents or 15 cents per pound and still leave a marginal profit.

There are certain cautions, however, which it would be well to add. The gas is poisonous even to men when inhaled in quantities. It is very inflammable and yields, with air, an explosive mixture. The products of the combustion, carbonic acid and sulphurous acid, are also irrespirable and very suffocating, so that in case of an accidental fire, there is nothing to do but to let it burn. The vapor also, it must be remembered, is nearly three times heavier than air, and so, if allowed to escape, it easily flows into the fire and the explosion ensues. To avoid this, it is necessary to have an intelligent, trustworthy man, who will see that all joints are tight and that the condenser is kept cool. It is also well to have the fire-place separated from the condensing apparatus by a brick or iron wall.

In transporting the liquid also, care must be

taken. The vessels, if of glass, must be sufficiently thick; and, if of iron, must be tight enough to prevent leakage and the whole must be kept cool.

We would remark that for the particular use mentioned, purification is not necessary, as the crude article is cheaper and answers even better than the pure.

We have not space for any further remarks on this interesting substance at present, but hope that "a word to the wise" will be sufficient.

Since the above was written we learn that the price of the bisulphide has, owing to the increased demand, gone up to \$1 per pound.

A NEW GOLD WASHER AND AMALGAMATOR.—A model of a gold washer and amalgamator, invented by Bryan Tyson, of Washington, D.

The Eureka Process.

At No. 10 Stevenson street, in this city, R. F. L. Hallock, the inventor of the above method for the treatment of refractory ores, can be found, ready to explain the nature and advantages thereof, save, of course, the secret that constitutes its most distinctive feature. Mr. Hallock claims a long experience as a practical metallurgist, having been fighting the rebellious-ore problem ever since the summer of '52, when he first tackled it in Sierra county. He has been waging the combat with the occult forces of chemistry ever since, and feels satisfied that he has at last got the better of them. As evidence of this, he proposes to take the most stubborn ore and extract therefrom the gold and silver, within 5% or 6% of the total it contains, at a cost never to exceed \$10, and ordinarily not more than \$4 or \$5 per ton. To this end, the ore, after being reduced to the size of cherries or a little smaller, by being passed through a rock-breaker, is roasted in a furnace, not very unlike those most in use, save that the structure is conical in form, the sides approaching each other at the top. The advantages of this shape are that the heat is more concentrated or rather prevented from escaping so readily from the stack, while the slag is less likely to adhere to its inner surface. At the top of the chimney a condenser is affixed, being either in the shape of an aperture, for admitting the air, or a cone with a spray of water. The floor of the furnace is covered with ashes and is set at an angle sufficiently steep to facilitate the discharge of the roasted ore, which falls into a tank, filled with a chemical solution, that, after a short retention, oxidizes the iron, decomposes, or, at least, greatly softens the gangue, disintegrating, in fact, all the integral parts of the ore, while it so furnishes the precious metals. That the quicksilver seizes and holds them with greater readiness, the amalgamation being effected in a pan, rigged and run in a pan constructed for the purpose.

To this plan of treatment, the Meadow Lake ores, the most mulish in the country, have succumbed readily, and the inventor feels sure that he can reduce these at an expense, on the ground, not to exceed \$6 or \$8 per ton. The cost of works will, of course, vary with capacity. But a furnace with necessary appendages, capable of handling 20 tons per day, can be put up in California for about \$700, and it will even be possible to put up one of a ruder style and of less capacity, but equally effectual, for half that amount. It is proper to state, in this connection, that Mr. Hallock claims less merit for his process on the score of close working than of cheapness, the cost of his furnace as well as of operating it being extremely moderate.

Mr. A. J. BOWIE, the mining engineer, has returned from this city to the Black Hills, after having perfected his plans of operation for the California company by whom he is employed. While here Mr. Bowie arranged the plans for an 80-stamp mill, which is shortly to be erected in the Black Hills, but will be made in this city. The mill is to be first-class in every respect, and will really be a model gold mill, as that of the bonanza mines is a silver mill. All the appliances possible for effecting a saving of labor or money, will be utilized. The arrangement of the machinery is such that batteries will be placed on opposite sides of the building, everything flowing towards the center, and the whole process may be inspected and superintended by one person in the center of the building. We shall give a detailed description of this machinery when completed. Mr. Bowie's first work in returning to the Hills, will be to bring in a supply of good water, which will necessitate the construction of an extensive ditch.

THERE is excitement among the quartz miners in Amador county, California. It is reported that quartz has been discovered near Plymouth worth \$1,000 per ton. In one instance a single blast threw out a piece of rock worth \$6,000. The Empire mine returns a profit of \$14,000 a week. It has a ledge 44 feet wide and nearly a mile long, and a mill with 80 stamps.

miners would do well to examine into the subject.

A GENTLEMAN just returned from Bodie gives the *Renew Gazette* a gloomy account of matters in that region. He says the Standard is the only paying mine and that 500 men are idle in the town. The number of arrivals and departures is about the same, some 30 persons daily coming into the camp and an equal number of "husted" ones sorrowfully leaving. The work of prospecting continues principally in a southern direction from the Standard mine and along the same ridge. Several hundred claims have been located, but no one body of paying richness has been discovered.

NEW DIGGINGS IN CALAVERAS.—The discoveries in Old Woman's gulch and vicinity have created a great excitement. The whole country for a long distance is claimed by eager prospectors. There is a large amount of gravel in these claims and it is very rich and well located for hydraulic mining.—*Chronicle*.

The Late Prof. Joseph Henry.

(Remarks before the California Academy of Sciences by ROBT. E. C. STEARNS.)

Members of the Academy:—Death, which hath all seasons and conditions for its own, has just stricken from the roll of the living one of the illustrious names of the century, a name eminent in intellectual, especially scientific circles, throughout the world. I refer, of course, to the late Prof. Joseph Henry, whose long life service to his country and to mankind as an educator and scientific investigator, and as the organizer and head of the Smithsonian Institution, placed him naturally, and justly, at the front, as the representative of science and scientific thought and culture in America—a position which he filled because of his high attainments, and through the conspicuous nobility of his character, with exceeding credit to himself and to the manifest advantage of science and his country. A man of great, yet unassuming excellence, whose merit met him was at once impressed most favorably by his quiet, yet cordial greeting, his dignified, yet genial welcome. His native breadth of mind, his wide reading, correlated with and refined by an ample and generous philosophy, impelled him, even early in life, to regard not this or that direction of study or path of knowledge, only, as worthy pursuing, but that the simple text or legend should stand as an axiom resting upon the everlasting foundation of truth, that "Knowledge should be pursued for its own sake." This made him appreciative of the special study and work of others, and his friendly interest and sympathetic words stimulated and inspired the student to continued and increased effort.

I will not recite by title in long enumeration the many responsible positions he filled—the experiments, investigations and discoveries he made, or enlarge upon the numerous honors conferred upon him by the higher institutions of his own country, or repeat the tributes paid to his achievements by the highest intellectual and governmental authorities of foreign lands. Turning from those well-merited honors, acknowledgements not less of eminent ability than of his scientific integrity and personal worth, we are led to survey the completed life, in its rounded term of 80 years, as a whole, as we would view from afar, some stately tree whose lines are full of strength and beauty, and we are curious to learn what beneficent star was in the ascendant, what occult charm and power of circumstance, nurtured and protected and led him onward through the days of his youth and hazed the path for his later years. In turning to his early life, to the time when he first went forth on its now completed voyage, we find that he was not born a favorite of fortune, as that term is usually understood, meaning an environment of luxury and ease; but, if we give a higher and better definition to the phrase, we may well regard it as fortunate for him and for the world that he was born with a profound and abiding thirst, an irrepressible longing for knowledge, which determined his destiny and molded his career; which led him upward and onward, though by no royal road devoid of labor.

Had his mind been colored at all by avarice, or the desire for wealth, or, if in his earlier years it had received the impress of commercial bias through experience in trade, he might, through his numerous and important discoveries, extended into inventions, especially in electricity in its practical application, have accumulated wealth as did others of less knowledge, who reaped in this productive field. His fortune so far as regards material wealth was like that of others, of nearly all of the great, the earnest and sincere teachers and philosophers, who have labored faithfully and unselfishly for the cause, seeking with a single mind in all its strength only for the increase and diffusion of knowledge among men.

During the official term of President Fillmore, in addition to his other numerous duties, he was appointed to the light-house board, a most important service, and his visit to this coast, which occurred a few years ago (September, 1871), was in connection with his position, and his presence at the Academy on one occasion, during said visit, will long be remembered by those who were present at the time.

His life is ended, but his memory will be cherished by all who knew him, and like the usefulness of his labors, shall endure for years. His career constitutes a monument marking the advancement of human thought and the intellectual progress of the republic in which he was so eminent a citizen.

SODA MAKING IN NEVADA.—The owners of Soda lake, a short distance above Ragtown, have commenced operations for the season. They manufacture about 300 tons of soda each summer. The crude soda is worth about \$50 per ton in San Francisco. In making it the water of the lake is pumped out upon a convenient flat, where it is evaporated, as is salt water in the manufacture of salt. The crude article is taken to Wadsworth on wagons, and from there is sent to San Francisco.

REGULATING IMMIGRATION.—Senator Sargent, has introduced in the Senate, making it unlawful to bring within the jurisdiction of the United States any paupers, lunatics or criminals—not including political convicts—or any involuntary emigrant under a labor contract, etc., and authorizing the various States to enact laws for the exclusion of such persons from their respective limits.

Porphyry and the Use of the Magnifier in Determination of Rocks.

At the meeting of the San Francisco Microscopical Society on May 16th, a paper was read from Mr. Melville Attwood, F. G. S., concerning porphyry and the use of the magnifier to the practical miner. Mr. Attwood's paper was accompanied by 22 rock specimens, illustrating a new method of preparing the same for determination, and 24 slides of sections of these rocks. The paper by Mr. Attwood we print in full, as it is of value to those engaged in the science and industry of mining:

"Porphyry."

The generally accepted meaning of the term porphyry, without addition or qualification, denotes "quartz porphyry," a plutonic rock, with a compact matrix or ground mass, consisting of quartz and feldspar, with distinct crystals of both, having a specific gravity of from 2.5 to 2.6 and containing from 75% to 85% of silica.

What rock the Comstock miners mean when they say porphyry it would be exceedingly difficult for any one to tell. In reading over the published reports of the different Superintendents, they appear to be continually meeting with it in all depths and to the east and west of the different bodies, also in the shape of "horse," or dead ground, mixed with the vein matter, and called "bird's-eye porphyry." Now, in 99 cases out of 100, what they call porphyry does not in any one respect resemble that rock, la king by 25% the required amount of silica and having no free quartz. A very slight examination by any one having only a rudimentary knowledge of geology would show that the term porphyry, so applied, is the most inappropriate that could be used to describe either the west or east country rock of the Virginia portion of the great Comstock lode. The only way I can account for the use of that term, is that they prefer it to saying "country rock."

I hardly think it requires me to say how desirable it would be, indeed, necessary, for those conducting explorations and trials on the Comstock range, to know and be able to distinguish the different rocks they meet with in their operations, particularly as those rocks enclose some of the richest mines yet discovered in the world, and since the cost of those very explorations amounts annually to millions and millions of dollars.

It may be urged that the geological maps of the exploration of the 40th parallel contain most of the necessary information. I would recommend those who think so to examine the maps, or any of the cross-sections of the workings on the Comstock, beautifully drawn, I believe the work of Mr. Stretch, but colored by the officers of the survey, and they will find that the Mount Davidson diorite is colored as syenite, and the black dyke, a dolerite, as andesite. Most of the country rocks overlaying the Comstock on the east are marked as porphyry and andesite. The so-called porphyry and andesite are identical in chemical and mineralogical composition, and a slight inspection of the Suto tunnel and other drainage levels will show that petrologically they are the same, in fact the only difference being that the former occurs in sheets and the latter in dykes. When the felspar in the so-called porphyry is very much kaolinized, the rock is sometimes termed by the miners bird's-eye porphyry. It may be said that the new work by Ferdinand Zirkel, *Microscopical Petrography*, corrects many of those errors, by admitting in the first place that the Mount Davidson rock is a diorite. No mention, however, or section, is given of one of the most important rocks of the Comstock range, the black dyke, and on the explanation of the beautifully colored plates he has neglected to state the number of times they are magnified. This is a most unfortunate omission, particularly so with respect to the basaltic rocks. My attention was called to it by some remarks in one of the Virginia papers, wherein it was stated that one of the handsomest colored plates was a section of basalt from American flat. Now, dolerite, anesite and basalt, are, in a mineralogical point of view, the same rock, differing only in the fineness of texture.

On No. 14 slide I have mounted a section from each of those rocks, so that their difference in texture may be easily distinguished.

Rock and section No. 15 is a sedimentary one, from the Hawaiian Islands—the grains of sand in it averaging 2-100 of an inch in diameter, and, as you will see, consists of coral sand, shells, fragments of basalt, and small pieces of magnetic oxide of iron—the crystals of feldspar in the grains of basalt can be seen with a common lens (and Mr. Hyde has kindly offered to measure the length of them for me.)

The following are the approximate measurements of the crystals of feldspar in these rocks:

In the black dyke they average from 7-600 to 20-600 in length by 1-1200 to 10-1200 in width.

In the dolerite, they are of irregular shape, but generally about double the size of those in the black dyke; while there are small masses containing small needle-shaped crystals 1-300 to 4-300 in length.

In the basalt, they average from 4-1200 to 9-1200 long by 1-1200 to 2-1200 in width.

Eight pages, however, in that work with a colored section, are devoted to what is called "Angite Andesite." Now, though I have taken a great deal of trouble, as yet I have not been able to procure a single specimen of that rock called andesite. A few months ago, a very

good authority on such matters, Alphons Stabel, of Dresden, passed through this city on his way home from South America, where he had been collecting rocks for many years. Knowing that he had been at Chimborazo, I thought it would be a good opportunity to get what I wanted; so when he called upon me I asked him as a favor to give me a specimen of andesite. He said that he was very sorry he could not comply with my request, that he really did not know any such rock.

I am fully aware that looseness in petrological nomenclature is the rule and not the exception, and that many geologists are found writing of totally different rocks under one and the same name. I do not think that any distinction between rocks is worth much unless it can be applied in the field. I have stated that the black dyke, a dolerite, but which from the fineness of its texture might be called anesite, was one of the most important rocks in connection with the Comstock mines, from the fact that it forms the west boundary to all the vast treasures of the Comstock, no ore worth mentioning ever having been found at the west side of it; therefore every miner conducting operations in that district ought to possess the necessary amount of knowledge to enable him to distinguish that rock. If you will look at No. 12 rock and section, you will find that it is fine-grained and apparently of so homogeneous a texture as not to admit of its constituent minerals being resolved by the naked eye. I have quite a collection of specimens which have been given to me, supposing them to be that rock.

In 1867, when engaged in the examination of the gold mines of North Wales, the well-known mining engineer, Mr. A. Dean, gave me the rough tracing of the working plans of the St. David's mine, Clogau, near Dolgelly, and which I have brought for your inspection. The geological features of that district are the Cambrian rocks, overlaid by the lower silurian. The St. David's vein is partly in the silurian slate beds, and sheets of greenstone (diabase) lying between the slates, and partly in the Cambrians. What I particularly wish to draw your attention to, however, is the transverse section, showing the gold bearing and non-gold bearing rocks of the Clogau mines, and the very important fact that only those portions of the veins were rich in gold, or productive, where the walls were greenstone.

Impressed with the truth of the discovery, on my return to California, I devoted a large portion of my time to the examination of the inclosing and wall rocks of the gold and silver-bearing veins of this coast. On the formation of this Society, I availed myself of the aid of the microscope to carry on my investigations, but soon found out that to do so with anything like satisfactory results, I must get a collection of well authenticated foreign types, to compare with and guide me in the work. Through the kindness of the late Mr. David Forbes, of London, Dr. Hector, of New Zealand, and, in this city, of Mr. H. G. Hanks and Mr. Charles Schneider, I have now a collection of some 500 specimens of foreign types, from which, with the assistance of my son, I have cut between 1,400 and 1,500 sections—some of them are very roughly done. I found it necessary to have two or three from each specimen, some cut very thin and others rather thick, to show color and for examination with the aid of the parabolic illuminator. My collection of rock sections from this coast is large; but the result of it all amounts to this. I found that every step I took I was traveling on a road that led me far away from what I wanted, which was, a method to make it easy for my fellow-miners to understand and distinguish the inclosing and wall rocks of the different lodes they were working—those rocks having so much to do with the productiveness of the lodes.

The Use of the Hand Magnifier.

By the merest chance, I have found out a simple way, which I think in a great measure will partly fill the gap so much needed.

The different pieces of rock which I now present to the Society are roughly prepared after this method, and made so that an inspection of the outer surface, viewed as an opaque object with only the aid of a common hand magnifier, will give all the information ordinarily required by the miner, and in most cases he will find that he is able to distinguish the structure and composition of the commoner rocks, so that with the help of a small collection of foreign types, prepared after the same fashion, he can compare and identify those under examination. It will be necessary for them to read up a little on the subject and to acquire a rudimentary knowledge of geology, which I think can be best done by a careful study of such works as "The Student's Manual of Geology," by J. Beete Jukes, 1857; "Text Book of Geology," by Dana; "A System of Mineralogy," by Dana; "A Treatise on Lithology," by Van Cotta; English edition by P. H. Lawrence; and "Determination of Rocks," by E. Jannettas, translated by Plympton.

The rock for examination may be prepared as follows: First wash the specimen clean, using a brush to get rid of any clay or dirt; then select the side or part you wish to examine, and grind it down on a piece of sandstone (a shoemaker's sharpening stone) until a perfectly flat surface is obtained. This will occupy but a few minutes, unless the rock is very hard. The surface should then be worked down still finer with a square emery file, using water, and after you have obtained a sufficient polish, wash the rock again, and then let it dry gradually, either on a stove, or, what is better still, a little brass table,

with a spirit lamp, the same that is used for heating slides. When perfectly dry, heat it again to a point, so that you can barely handle it; then polish the varnished side while hot with a moisture of one part of Canada balsam to three parts of alcohol, which must be warmed before applying it, and laid on with a camel's hair brush. It will soon dry, and if left for a day or two will harden, so that you can handle it without injury.

The effect of this treatment is remarkable, particularly on the lavas, as you will see by the specimen of trachyte lava from Bodie, which I now present to the Society.

In conclusion, it is with great hesitation that I have ventured to bring this matter before you, but I do so well knowing that more searching and exact methods of investigation are now demanded by those conducting large mining operations, and that such terms as porphyry, for any and all enclosing, or wall rock, that may be met with in such mines as the Comstock, and the term green chlorides, for the rich ore, will not be deemed a sufficient explanation, or tend to give the mine adventurers that confidence in the reports of their employees which they should be entitled to, particularly when it is known that the rock is not porphyry, and that the chloride of silver is one of the accidental minerals met with in the vein matter.

I am in hopes that by thus breaking the ice, others more capable in every respect than myself will be induced to communicate the results of their researches on the subject.

All that can be claimed for the mode I have suggested to you for the examination of rocks is that it is a rude and simple way of determining some of the commoner ones, but the application of the microscope, even now quite in its infancy, is after all what we must trust to for exact or reliable results.

NOTE.—The best pocket lens is "Tolle's Trip-let," but it is costly; and I would recommend a combination of three lenses, which can be purchased for about \$2.

Picket Post.

About 30 miles northeast from the town of Florence is situated the flourishing village of Picket Post. Some years ago, in Indian times, when General Stoneman was in command of the military forces in this section of Arizona, he had his headquarters at Pinal ranch, and established an outpost on Queen's creek, where is located the mill of the famous Silver King mine. It was not known in those times what a vast mine of mineral wealth slumbered beneath the ground for which the military authorities and the Indians disputed, and only a few years have passed since prospectors drew attention to the fact that the Pinal mountains were indeed a treasure house. There are those who verily believe that the Silver King is the richest silver mine in the world, while others do not esteem it more valuable than the Peck or McCrackin mine. About 15 tons of ore per day is concentrated in the mill at this place, which has five stamps and rumor says that the company clear \$50,000 per month. No work has been done on the mine for some time, as there is sufficient ore on the dump to supply the mill for a year. The capacity of the mill will be doubled. A reliable San Francisco corporation has machinery on the ground near Picket Post for a custom stamp mill, and are delayed in their operations on account of the difficulty of procuring lumber from Prescott. The corporation is known as the Pinal Mill and Mining Co., but is in no manner related to or connected with the smelting outfit of that name which victimized some of the Yavapai people and left an enduring monument of its folly. Hundreds of locations have been made in this pioneer district, and rich discoveries are constantly reported, but the development of mines is by no means rapid, owing to slow, uncertain and expensive transportation; the expense of living, and lumber at \$150 per thousand. The miners in these mountains are a hopeful, genial, cheerful set of men, having neither poverty nor riches, but an abundance of faith.

INVITED TO BRITISH COLUMBIA.—We understand that Prof. J. S. Phillips, of this city, has been urged by influential parties residing in British Columbia to remove to that Province and take up his permanent abode there. While this gentleman has, during a long residence in California, met with great appreciation here, it is possible he might find in British Columbia professionally a more inviting field. That it is less crowded is no doubt the case. Indeed, we have reason to believe there is a lack of thoroughly capable metallurgists and mining engineers in that country. However this may be, our colonial neighbors may consider themselves fortunate should they secure the services of one so well qualified to advance their growing mining interests. Prof. Phillips has had 40 years of practical and theoretical mining experience; 28 in the mines of Cornwall and 12 on this coast. He is complete master of the business in all its departments, being acquainted with both its science and its practice. He is the author of one of the most complete and useful works on metallurgy and kindred branches extant. He is an accomplished assayer, the inventor of many ingenious devices, knows how to open a mine, put up a mill and manipulate the ores. His record both as regards competence and fidelity is as good as that of any other expert on this coast, and we feel certain that he will not suffer this good record to be tarnished should his labors be transferred to another field.

MECHANICAL PROGRESS.

Bearings Without Oil.

We have already given items of the new substance called "metalline," which some experimenters expect will do away with the use of lubricants in bearings. It seems that the introduction and test of the substance is being pushed forward. Mr. Bateman, member of the Chemical Society, in a recent lecture on "Metalline," as published in *Iron*, gives the following points: "It has been found that the inherent strength of this material is not enough to carry any but light weights, therefore a solid bearing of this substance is inadmissible, but it is inserted in the ordinary brasses, being accurately drilled for the purpose—generally about ten to the square inch. The whole bearing surface is well covered by holes plugged as described, these holes being so drilled as to break joint and protect the entire brass. The protecting ends of the plugs are cut or filed off roughly. A few hours' running completes the fitting and gives a perfectly true bearing surface, the plugs, once down to the level of the brass, wearing no more. The impalpable powder of which the plugs are composed, wearing away, polishes off the asperities and points of brass and iron, the two surfaces come together, there is nothing rough to tear, catch or 'fire,' and so accurate a fit is insured as that no dust, dirt, debris or other extraneous substance can interpose itself and cause cutting of the moving and fixed parts.

"The idea is so new, so opposed to all preconceived ideas, that the natural tendency is to say, 'too good to be true.' But 'facts are stubborn things,' and next Monday morning there will be running, to my personal knowledge, in London alone: Main shafting, 3½ inches, at 150 revolutions per minute; counter shafting, 2½ inches, at 350 revolutions; lathe head (about), 1½ inches, at 2,000 revolutions; loose pulley at 450 and 700 revolutions—all having been at work from one to nine months, and never having had during that time one single drop of oil or other lubricant. In other parts of the kingdom there are main shafting five inches and calendar rolls with 10 tons and more pressure—printing machines, spinning frames, circular-saw spindles, wood-working machinery, sewing machines, cranks, bicycles, etc. On the table are samples of brasses showing the three parts of the process, drilling, fitting and paring oil; also specimens of the drills used, a pair of brasses that have been running in my own shop nine months, and a loose pulley taken down to-day for the first time after nine months' running, at 400 to 450 revolutions per minute, ten hours a day, without one drop of oil. The shaft is unaffected where this pulley has run; there are wire gauges of that part, and three inches off, showing an inappreciable difference.

"I can mention instances where, after such running as with oil, would have necessitated new brasses, these latter are positively unaffected. It is evident that should what is claimed for metalline be borne out by further experience, it cannot fail to be a most important invention. It is not likely it will entirely supersede oil in all directions; but for loose pulleys, pulley sheaves, inaccessible main shafting, machines and factories where valuable fabrics are exposed to injury from oil drippings, etc., it must be rapidly introduced."

PLATINUM-COATED IRON.—M. Dode, of Paris, the well-known discoverer of the Platinum mirrors, has invented and patented a process for coating iron with platinum. The iron first receives a coating composed of lead and copper, and then the platinum is applied. The first coating is prepared by mixing 22 parts of borate of lead and four and one-half parts of cupric oxide in oil of turpentine, and is applied by means of a fine brush. The platinum coating is prepared by converting 10 parts of platinum into chloride and mixed with five parts of ether and permitted to evaporate in the air. The residuum is mixed with a viscid combination of 20 parts borate of lead, 11 parts red lead, and some oil of lavender, and 50 parts of amylalcohol added to the whole. In this mixture the object to be platinized is dipped, allowed to dry in the air, and then heated to a moderate temperature.

NOTES ON FRACTURES.—Prof. Egleston, in a paper read before the American Institute of Mechanical Engineers, states that investigation seems to show that the fracture of almost all the broken steel rails started in defects which escaped observation, produced probably by careless manipulation. Notching or punching greatly decreases strength; drilling must be resorted to for holes. Severe cold has been observed to rapidly increase the breakage of steel rails, which is supposed to be due to the want of elasticity of the road bed.

GILBERT ELEVATED RAILWAY.—A satisfactory trial trip over the Gilbert Elevated Railway was recently made in New York. A train of four cars, containing two hundred passengers, was drawn over portions of the route at a speed of 25 miles per hour, and the feasibility of furnishing rapid transit through the streets of a crowded city was thus conclusively demonstrated. The line is more than five miles in length, and the trip between terminal points, including one stoppage, was made in sixteen minutes.

European Pattern of Rotary Engine.

We find in our foreign exchanges a description of a style of rotary engine devised by J. Congnet, of Brussels, which will enable our mechanics to compare his designs with their own. A metal cylinder is mounted on a frame and provided with covers through stuffing-boxes, in which a rotary shaft passes. Upon this shaft and within the cylinder is keyed the nave of a rotary piston, which extends from the nave to the inner surface, and from end to end of the cylinder, a tight joint between the piston and the ends and inner surface of the cylinder being maintained by metallic packing, consisting of blades or strips of brass, or other suitable anti-friction metal let into slots formed in the sides and end of the rotary piston, which blades or strips of metal are forced outward against the surface of the cylinder and cylinder covers by steam introduced into the slots through suitable holes in the said piston. A tight joint is also maintained between the nave of the piston and the cylinder covers by annular blades or strips of anti-friction metal let into annular slots formed in the ends of the said nave; the said annular packing being pressed outwards in contact with the cylinder covers by steam admitted into the said annular slots through suitable holes. The passage of the piston from one to the other of the chambers into which the cylinder is divided is secured by the use of sliding plates. Steam is admitted into the cylinder through a suitable channel formed by a steam-jacket round the upper part of the cylinder, and the steam is discharged from the cylinder by channels formed by the steam-jacket round the lower part of the cylinder. On each side of the said cylinder is a steam-chest, with a steam-port governed by a slide valve or other suitable means, and the cut-off may be regulated by any suitable means. The steam in the steam-chest, passes partly through a channel to behind the sliding plates, so as to press them inwards. Sometimes two rotary pistons are used, one projecting from each side of the nave upon the rotary shaft. The steam is then admitted and discharged on each side of the cylinder simultaneously. When the engine is to be set in motion, the sliding plates being both closed, so as to divide the cylinder into two parts, steam is admitted between the face of the piston and one of the said plates, and forces forward the said piston towards the second plate; meanwhile, the cam surface forming the back part of the piston in its rotation forces out the second plate, and causes it gradually to retire into its chamber, the cam surface gradually filling the space between the said plate and itself, and expelling any steam behind it through the exhaust channel. When the piston has passed the second plate, the plate returns into position in the cylinder, and steam being admitted between it and the piston, the same result is produced, and the piston continuing its rotation the same action is repeated.

COMPOUND ENGINES FOR LOCOMOTIVES.—M. Mallet has presented a communication to the French Academy on the application of the compound system to locomotives on the railroad from Bayonne to Biarritz. The engine has two cranks, at right angles, driven by two cylinders, one on each side. They have a range of 0.45 m., the diameter of one being 0.24 m., the other 0.40 m. Under ordinary circumstances the steam from the boiler passes first into the small cylinder, then into the large, where it acts expansively, and finally escapes into the chimney. But on starting, and whenever the engine is required to surmount an increased resistance, the steam may be admitted directly into the large cylinder, and the locomotive acts as an ordinary two-cylinder engine. The plan has been adopted in three engines, with four coupled wheels of 1.20 m. diameter; the boiler has 45 square meters of heating surface, and acts with an effective pressure of 10 kg. per square centimeter. They are employed in local traffic, on grades of 0.015. Their action is unexceptionable, their steadiness leaving nothing to desire, even at a speed of 40 km. per hour, and the management being no more difficult than in ordinary engines. The draft, notwithstanding the reduction of the steam jets to one-half, is ample, so that the boiler, in spite of its small dimensions, supplies the want of the engine abundantly. As for the consumption of fuel, the gross cost per kilometer is 4 kg. of Cardiff coal for trains weighing 50, 60 or even 70 tons. The foregoing facts are derived from a service of 40,000 km., performed since the system was adopted. They have, therefore, an important practical value.

A MECHANICAL CHESS-PLAYER.—*Iron* has been favored by the inventor, Mr. C. G. Gumpel, with a private view of a mechanical figure which plays chess, and plays it very well, too. It is not to be confounded with the so-called automaton chess-player, within which is concealed a living player, and in which a heterogeneous congeries of wheels and levers is packed for the sole purpose of deceiving the spectator. The figure, which is modeled and dressed to resemble the stage Mephistopheles, is purely mechanical, and we were satisfied that nothing was inside it excepting the chains and cords employed to produce the necessary movements. It is in a sitting position, the right arm and hand, with which the moves are made, being alone free to move, and the action is amazingly natural. Of course the intellectual operations of the chess-player must be performed in another room, the mechanical part of his duty being ingeniously transferred to the figure.

SCIENTIFIC PROGRESS.

How to Study Science.

Prof. F. W. Clarke has an article in the *Popular Science Monthly* for June, in which allusion is made to the true method of studying science: Every student of science should meet Nature at first hand, and learn to observe her phenomena for himself. Lectures and text books are but minor accessories to study; in the sciences they play a wholly subordinate part; in the laboratory, the field and the museum, the chief work is to be done. No matter what branch of science is to be pursued, the student from the very first must meet it face to face. The biological sciences ought to be studied in the field, collecting; in the museum, classifying; in the laboratory, with the microscope and the scalpel. Far too often is the study of natural history degraded into a mere memorizing of classifications; as if the transitory part of the science were more valuable than the permanent! The student must see, handle and investigate for himself. He is to study the phenomena of life, and not merely the external appearance of a lot of stuffed specimens. Chemistry, and physics also, is to be studied chiefly in the laboratory. It is not enough for a student to see experiments, he must perform them. Thus only can he learn the true scope of these great sciences. By a proper drill in qualitative analysis, he learns to observe closely, and to reason from his facts to their interpretation. Quantitative analysis gives him accuracy of manipulation, and an insight into the absolute value of experiment. This insight also results from delicate practice with instruments of precision in physics; a kind of exercise of the very highest educational value. If the course of study in any science can be capped by an original research leading to the discovery of new facts, so much the better. In a German university the candidate for a doctoral degree in science is absolutely required to carry out such a research, and to submit a dissertation upon it. This is not a severe requirement—every student who has been decently trained is able to come up to it, all the popular notions about the mysteriousness of scientific research to the contrary notwithstanding. Why should we not aim to equal the German standard?

AN ACOUSTICAL APPARATUS.—At a recent meeting of the Physical Society, Lord Rayleigh exhibited an apparatus he has employed to secure absolute uniformity of rotation of an axle for certain acoustical experiments. As described by the *Iron Age*, the axle is driven by a power just sufficient to produce the desired speed, and at equal distances around its circumference are arranged four soft iron armatures, which pass successively in front of the poles of a horse-shoe electro-magnet. The current is rendered intermittent by passing it into the body of a tuning fork, vibrating about 40 times per second, which it leaves through a small platinum stud touched at each vibration of the fork, the current traversing a small electro-magnet between the prongs, and maintaining the motion of the fork; thence it traverses the horse-shoe electro-magnet and returns to the battery. If the driving power is just sufficient to produce the required speed, the axle making one revolution to every four vibrations of the fork, the armatures will be so attracted by the magnet as to be opposite to it at the middle of its period of magnetization; but if the driving power is insufficient, or from any cause the armatures are displaced from their proper position, they will be attracted by the magnet until the error is compensated. The axle also carries a hollow metallic ring, filled with water, to act as a drag. A disk perforated with rings of holes rotates with the axle, and by looking at one prong of the fork through a ring of holes corresponding to the number of vibrations made by the fork, it is easy to see that the uniform rate is maintained by the apparent stationariness of the fork-prong.

RESPIRATION AT HIGH ALTITUDES.—At a recent meeting of the English Royal Society, Dr. William Marcet communicated a paper on "An Experimental Inquiry into the Function of Respiration at Various Altitudes." His experiments were mainly undertaken with the view of inquiry into the state of the respiration of tourists at various altitudes and under the different circumstances met with on Alpine excursions. Pectenkofer's method was adopted in the estimation of carbonic acid, and the experiments were many in number. The original mask worn to collect the air breathed out and the india-rubber bags that received the breath were described. Dr. Marcet confirmed previous experiments in the fact that the quantity of carbonic acid breathed out is greater after food has been taken, and in his experiments on respiration at high altitudes, he endeavored to neutralize the effect of food by taking an early breakfast and a late dinner and doing the climbing between the meals. Experiments were made at the Breithorn, 13,685 feet; St. Theodule, 10,899 feet; the Riffel, 8,428 feet; St. Bernard, 8,115 feet; and the Lake of Geneva, 1,230 feet. In experiments made while sitting, Dr. Marcet finds that there is an increase of carbonic acid breathed out as a person rises above the sea on a mountain excursion, and that this is due to the fall of the atmospheric temperature and to the cold produced by increased evaporation from the body, arising from

the diminished pressure of the atmosphere. In short, more carbonic acid is formed in the body to counterbalance the influence of cold from the causes just mentioned. If, on ascending to a higher level, we should find the same atmospheric temperature as we left at the lower station, still an increased amount of carbonic acid would be expected on account of the cold due to the greater cutaneous and pulmonary evaporation. Dr. Marcet experimented in a similar manner while ascending hills. Walking up rapidly over rocks and grass patches yields most carbonic acid, the amount being 3.155 grms. per minute, which, he said, was attended with the inhalation of the largest volume of air breathed. Ascending quickly at the light of St. Theodule, caused a considerable elimination of carbonic acid through the lungs, amounting to 2.972 grms. On the other hand, walking leisurely up hill at the St. Bernard gave rise to the production of no more carbonic acid than quick walking on the level ground at that same station.

SUBMARINE VOLCANOES.—We find in *Iron* record of two recent observations on the effect of submarine volcanoes. The master of the British barque *D. M. B. Park*, which arrived at Cowes, Isle of Wight, some days ago, from Batavia, reports having seen several submarine volcanoes on January 29th 7 A. M., in latitude 42° 20' N. and longitude 21° 44' W., about 900 miles southwest of Sierra Leone. Large volumes of water were thrown about 100 feet into the air, and the whole sea in the neighborhood was in a state of violent commotion with a strong under-current. The weather was calm, but with clouds and rain; sounds as of distant thunder accompanied the outburst. The other report is from New Zealand, Captain Helander, of the steamer *Go-Ahead*, while on a voyage from Gisborne to Auckland, reports having witnessed a curious phenomenon on December 1st last, between 8 and 9 P. M., when about five miles from land off Open Bay. The sea a short distance ahead of the vessel was observed to be a mass of seething foam, traveling at a rapid rate towards the vessel. The course of the steamer was changed in order to avoid the disturbance, and though it cleared the outer edge of the agitated water, the influence was felt for some time, and the vessel pitched violently until long after the actual scene of the agitation was passed. There is no doubt that the phenomenon was due to volcanic forces, a slight shock of earthquake having been felt at Gisborne on the preceding evening. When we consider that the observed effects of volcanic force on the habitable globe occur on an average once in three days, it is easy, with such examples before us, to imagine that an incessant discharge of the pent-up forces of the interior of the earth is going on, and that not a day, perhaps hardly an hour, passes without some disturbance occurring in some portion of the oceans and continents which the earth comprises.

EXPERIMENTS WITH FLOATING MAGNETS.—Prof. A. M. Mayer describes, in the *American Journal of Science and Arts*, some entertaining and easily performed experiments in magnetism. Several sewing-needles, No. 5 or 6 size, are magnetized with the same polarity, so that all their points are north. Each needle is passed into a small cork that will just float it upright; the corks may ½ inch long and 13-16 inch across. The eye of the needle should barely be above the surface of the cork. Three, four or more of these needles are thus to be floated in a basin of water, and the north pole of a large cylindrical magnet is to be brought down over them. They will immediately take geometrical positions, the figure formed being the smallest when the magnet above is brought most closely to them. Three needles thus take position at the points of an equilateral triangle; four form a square, or a triangle with one in the center; five form a pentagon, or a square with one in the center; six form a pentagon, with one in the center of a triangle of three to a side. Prof. Mayer has obtained regular figures up to a combination of 20 needles. Some of the forms are stable; the needles may be sent out of the unstable into the stable forms of vibration. The experiments may be varied to any extent by the use of two or more magnets, inducing separate combinations.

A NEW METHOD OF DETERMINING THE HEAT VALUE OF FUEL.—With regard to the important question of the heat value of fuel, it has been proved that conclusions from the results of elementary analysis are very uncertain and also that little reliance can be placed on direct evaporation experiments. In a recent paper in *Die Chemische Industrie*, Dr. Weyl points out the faults of these methods and recommends, as preferable, decomposition of the fuel by dry distillation and analytical determination of the solid, liquid and gaseous products of decomposition. In this method the accident of too small a sample being used is avoided, as also too great pulverization and drying at high temperature and the decomposing action of atmospheric oxygen, which is therewith connected, and the whole of the coke is weighed, and its carbon, hydrogen and mineral constituents determined. The water, tar and gas that are formed are measured and their heat of combustion ascertained with the aid of data that have been supplied by Favre and Silbermann and Deville. The final result will, of course, exceed the true combustion value of the coal by the amount of heat equivalent to the work of decomposition into coke, tar and gas. The decomposition of the coal should be done as quickly as possible and at a high temperature.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

VOLCANO.—*Ledger*, May 25: More gold has been taken out around Volcano at this early stage of the season than has been obtained during a corresponding period for many years back. Of course the large hydraulic claims have not cleaned up. Work has been commenced on the old Golden Gate quartz mine. The shaft in the Down's mine at a depth of 140 feet yields good ore from a ledge two and one-half feet thick. The ventilating shaft being sunk on the Volcano tunnel is down 55 feet, half the depth required. The pocket of rich quartz struck in the Keystone last week was soon exhausted. Some of the ore contained from 30% to 50% of gold. The value of the pocket, as near as we can get at it, is somewhere in the neighborhood of \$6,000. Since the pocket excitement subsided, a fine quality of rock has been uncovered in that portion of the mine bordering on the Eclipse company's mine. Parties who have witnessed test trials of the Kendall one-stamp quartz mill say it will crush three tons in 24 hours.

BUTTE.

MINING ITEMS.—*Mercury*, May 24: A large bar of gold, containing some \$32,000, was left at the bank of Rideout, Smith & Co., of this place, on Thursday, being from the Spring Valley Mining and Irrigating Co. A very fine specimen of quartz was left on our table Thursday, having been found in the pocket of Peter Allis, who was found dead near Cow creek a few days ago. The mining claim of C. M. Ury, on the South Fork, is being worked quite extensively this spring. It is a bar claim, and supposed to be one of the richest in the county. Mr. Ury is working a crew of eight men, and is putting through a large quantity of gravel each day. He has got all the machinery needed, and it is running well and at but little expense. No doubt we shall hear good reports from this direction this summer.

CALAVERAS.

HYDRAULICS.—*Chronicle*, May 25: The gravel mines in this vicinity are in full blast. There is an abundance of water and the miners are making good use of it. There will be some heavy clean-ups shortly.

"THE GOLD INDICATOR."—S. W. Howland, who has been prospecting in Calaveras with his "Gold Indicator," has made the discovery that a rich deposit of gold is lying in the crevices of the bedrock in the Mokelumne river, on Mrs. Hill's ranch, at the mouth of Camanche creek, and has formed a company called the Camanche Gravel Mining Co., for mining the ground with a dredging machine, known as Dennison's Patent Incurigator. A barge will be built on the ground and the machine will dig out its own channel by the suction principle, lifting up the dirt, sand and gravel containing the gold by a powerful suction, which will reach into all the crevices of the rocks and bring up its hidden treasure. One of the machines has been used on Middle river for a year past, dredging material for levees on Union island. It is thought that a large pocket of several tons of pure quicksilver, freighted with gold, will be found in the river, as the wastage of a quarter of a century of gravel mining in the numerous gulches and claims above. The ground has never been worked and is considered immensely rich. Mrs. Hill's alluvial farming land is being slowly mined out by Chinamen, who dig out the gravel and replace the earth in its normal condition, paying her a percentage, which yields her a revenue of \$200 a month. Indeed the alluvial banks of the river for miles have been worked over with profit, and it is reasonable to suppose that there is a rich deposit on the bedrock of the stream hitherto untouched.

EL DORADO.

OUR MINES.—*Republican*, May 23: The Pacific has cleared out the old drifts, retimbered where it was necessary and prospected a little, taking out some fine looking ore. The works are now nearly at a stand-still, awaiting the arrival of Thos. Price, who is to inspect and give further instructions as to future work. The Rose is being gone down upon, through a body of good looking rock, and the indications are decidedly favorable for a "big thing." Now down 150 feet. At the Keegan, things are being pushed, but the prospects at present are by no means flattering. If the same company have the nerve to continue operations a few weeks longer, something better may be developed. At the Hallock, things are progressing and look exceedingly favorable. The mill was started up on Sunday evening, with greatly improved appliances for saving gold. A run of 80 tons of ore at the Gross mill, Poverty Point, by a couple of recent comers, last week, yielded about \$15 per ton.

RICH CEMENT.—Hancock, Salter and the Oldfield brothers have opened a fine deposit of rich cement at their claim on Negro hill, just above Placerville. Several prospects made yielded from \$8 to \$15 to the pan, lead gold, some specimens weighing as much as \$2.50. Their claim covers about two acres, and their prospectings have proven that next the bedrock the cement deposit covers nearly the whole.

THE KEEGAN MINE.—Appearances here are

not as flattering as they were some weeks ago. The gentlemen who have the mine bonded, commenced drifting, a short time ago, both north and south from the 60 level. In both directions the level has narrowed almost to "pinching out" dimensions and an experimental crushing of 80 tons of quartz has hardly realized sanguine expectations. Nevertheless, the company are anxious to make a thorough test and inclined to make further explorations, sinking the shaft to a considerable depth, if Mr. Keegan will extend their time, which he will probably do, as it would be much to his interest.

NEW DITCH.—Mason & Kluough have a large force of men at work on a ditch, to bring water from Silver creek, over the ridge, to work their gravel mine, opposite the Pacific house. The ditch will be nearly 10 miles in length, when completed, and will carry over 500 inches of water.

FRESNO.

CENTENNIAL.—*Expositor*, May 20: The developments in this mine, situated near the head of Big Dry creek, are very favorable. The ledge has widened out considerably, and the ore is very rich. The owners of the mine are thinking of incorporating it and selling part of the stock, for the purpose of raising funds to put up a mill.

INYO.

GOLD QUARTZ MINES.—*Independent*, May 18: A number of ledges, that assay well in free gold, have been discovered in the Beveridge district, lying on the easterly slope of the Inyo range, some 12 miles from Cerro Gordo, and on the head of Big Horn canyon. The mineral belt, so far as known, extends from east to west about two miles and from north to south about one mile. The ledges, which run east and west, appear to be permanent, out-crop for a considerable distance, are from one to eight feet in width and assay from \$50 to \$150 to the ton. The gold occurs in the quartz in wires, scales and plates and are throughout associated with auriferous ochre, pyrites, chalcopyrites and galena, the pyrites largely exceeding in quantity all others. The inclosing schist is soft and easily removed in mining, thereby easily showing up large bodies of ore with comparatively little labor. The discovery appears to be a valuable one.

PLUMAS.

BUTT VALLEY.—*National*, May 18: The mines in this vicinity are all in full blast. The water of the Dutch Hill ditch was turned into the big pipe yesterday. The Dutch Hill tunnel is leased to other parties, the former lease having expired. The boys who had the first lease declared a div. of 5,000, and left a week or so ago. There is a chance for a big excitement in this district from the valuable discoveries that have been made during the past season. The "hoss" of Plumas is now the Savercool ledge. It is very rich and extensive. Forty-cent cents were obtained from half a pound of rock, and as high as five dollars to the pound. They have a tunnel in about 60 feet which shows a well-defined ledge eight feet wide, and it can be traced 6,000 feet. The rock prospects as well in one part of the ledge as another. It is rumored that the owners were offered \$50,000 for their claim which they refused, and wanted \$60,000. Baptista Picazoni, discovered a huge ledge not long since while running a bedrock tunnel to tap a channel. It is 20 feet wide and prospect well in free gold. There is a good deal of decomposed quartz and the hard rock shows fine results when pounded.

PLACER.

ABOUT DUTCH FLAT AND GOLD RUN.—*Forum*, May 23: The Gold Run English company will make a general clean-up this week, the yield from which is thought will be very large, owing to the known richness of the ground. Another powder drift is being run towards Potato ravine, the gravel extracted from which is exceedingly rich. The Miners Ditch company are doing extensive and profitable work at Gold Run. This company, having made three successful runs on the Illinois claim, are now at work on the North Star. Washing progresses steadily in the Sachs mine, the results from which are giving satisfaction. With the employment of seven men and the 500 inches of water utilized, the Church and Golden mine is being made to show unmistakable signs of a remunerative season's work. The Canyon creek undercurrents, belonging to Moody & Co., and those of Mr. Kinder's, which take their head at the tunnel of the Gold Run and Miners Ditch companies, are doing unusually well. Washing in the Baker was resumed on Monday. The third general clean-up in the Central mine will be made next week. Good results are looked for as the washing has progressed without interruption. The Lakamp mine now shows a bank of gravel 200 feet in depth. The gravel, although very hard in places, is worked to good advantage through means of holes bored with a 1½ inch drill, in which giant powder is inserted and exploded. The outer bench of gravel belonging to the Boston mine is being operated on by two men and 500 inches of water. The raising of the second incline has been completed in the Franklin, through which the mine is now worked. The bank, which shows splendid in blue gravel, has an average depth of 130 feet, and still increasing as they advance towards the channel. The Polar Star and Southern Cross continue to make extensive progress. Two powder drifts were exploded recently, and five more drifts are well under way, which, when completed, will be charged and exploded. A general clean-up will be made in both mines the first of June. Washing in the Elmore Hill

mine continues steadily. The new derrick, which has been in use about three weeks, is doing splendid work.

TRINITY.

BUCKEYE.—*Journal*, May 25: From A. J. Reed we learn that five companies have been working on Buckeye creek the past winter and that everything has been favorable. Mr. Reed who worked the claim highest on the creek, is the only one who has cleaned up any as yet, his mine "panning out" very satisfactory thus far.

BOALT'S HILL.—Capt. Atkins informs us that water is now run through the entire length of the Buckeye ditch and that a great deal of work is being done in the mine at Boalt's hill. We also learned that a clean-up was made in the mine last week, but was not informed as to the amount taken out.

TUOLUMNE.

HUNTER MINE.—*Union Democrat*, May 25: Hunter mine at Big canyon with the parallel vein belonging to the same claim is incorporated under the name of the "Gold Hunter Consolidated." This is undoubtedly a valuable mine and the fact that Mr. Long has been appointed to the superintendency will be a sure guarantee that it will be managed with honesty, economy and energy, he having had great experience in quartz mining and his long residence here has made him thoroughly familiar with the nature of the veins and leads in this section. Mr. Long is already at the mine and will commence work on the parallel vein immediately. The mill and machinery will be put in repair as soon as possible and work recommenced on the lower tunnel, which it is expected will strike the rich ore of the Hunter chute within 20 feet of its present termination.

SHASTA.

FROM THE MINES.—*Record*, May 25: Latest reports from the mining districts say that the miners are blessed with an abundance of water, and, in some instances, rich gravel. Taken all in all, the outlook is encouraging. Parties just arrived from New river, Humboldt county, report the discovery of new placer diggings on that stream. The diggings are said to be rich, but their extent is not yet known. Considerable excitement prevails concerning this report, as it has been long believed that rich mines would be developed in that locality. The gold is coarse.

SIERRA.

WATER STRIKE.—*Downsville Messenger*, May 27: The Bald Mountain company struck a heavy flow of water in their mine a few days ago. The water broke through the pipe-clay in gang-way 77, and ran about 60 inches for a time, but finally subsided to about 40 inches, and remained at that at last accounts. Several breasts were caved, and the workmen were obliged to leave the mine for a time. If the volume of water will continue through the dry season it will prove of great value.

SAN DIEGO.

HOPED FOR.—*News*, May 26: For some days past there have been rumors of new discoveries of placer mines a short distance from the city. A number of persons have visited them, and from a gentlemen of large mining experience we glean the following facts: The discoveries are at the base of the San Isidro mountains, about 30 miles from San Diego, and two miles north of the Mexican line. There are, up to this time, but two or three claims that are paying anything, although there are a large number of prospectors in the neighborhood. It is probable there are rich mines, both placer and quartz, in that vicinity, though, as yet, they are not found.

Nevada.

WASHOE DISTRICT.

CON. VIRGINIA.—*Gold Hill News*, May 29: Daily yield, 350 tons of ore, keeping the California mill steadily running. The ore stopes on the 1200, 1650 and 1750 levels afford no change worth noting, the ore being of a good uniform character and the breasts all showing favorably. The porphyry in the face of the west drift on the 1850 level was softening and showing signs of a near approach to the ore vein at six o'clock last evening, and it is more than likely that this drift will cut into the ore at that point today. The first section of the repairs, reaching from the depth of 500 feet to the surface, will be completed by Saturday next, ready to put in the guides. As soon as this is done, another, and by far the worst section of the repairs will be commenced at the 1500 station, the men working upward.

CALIFORNIA.—The ore stopes on the 1600, 1650 and 1750 levels afford no material change to note, but are each yielding their usual quota of rich ore. The east drift on the 1950 level is steadily advancing, the face in perfectly dry ground, and will complete a connection with the 1950 station of the C. & C. shaft a week from today if nothing happens to cause delay. The south drift on the 1950 level running to connect with the north drift from the Best & Belcher winze on the south line of the Con. Virginia, is making steady progress.

OPHIR.—Sinking the winze below the 1900 level is going vigorously forward, the bottom still in good ore. This winze is now down 108 feet perpendicularly, the entire size of the shaft having passed through rich, unbroken ore for the last 40 feet. What may be the width and extent of this ore cannot of course be told until matters are in proper shape for crosscutting. It is the intention to push this winze on downward to complete an air connection with a drift

shortly to be started eastward on the 2100 level.

SAVAOE.—The east crosscut on the 1640 level is now in a distance of 190 feet, having passed entirely through the porphyry after penetrating the 25 feet of low grade ore first found, the face now being in a splendid character of quartz, which shows improvement with each foot of advancement made.

BELCHER.—The pumps are being lowered and the pump-rods put in the incline shaft from the 2160 down to 2360 level. Sinking this shaft has been discontinued for a short time, in order to finish up the 2360 station. Sinking the south winze below the 1900 level to meet and connect with the south drift on the 2160 level is making good progress. As soon as this connection is made, crosscutting the 2160 level will be commenced.

JULIA CON.—The water is entirely drained from the 2000 level, and two crosscuts east have been started, one 100 feet south of the shaft and the other 200 feet. The first of these drifts will follow up the drill hole recently run until the quartz is reached. The heat is yet very great on this level, the steam created by the hot water being at times almost suffocating.

SIERRA NEVADA.—All the work in the mine is at present being done on the 2000 level, which is being opened up in the most energetic manner. At that point four drifts are being run, one east, one west, one north and still another south.

MEXICAN.—The retimbering and enlarging of the connecting drift with the Sierra Nevada on the 1600 level has already greatly improved the air circulation in both the Mexican and Union Con.

UTAH.—The south drift on the 1350 level is steadily advancing toward the south line, the face in favorable vein material.

HALE & NORCROSS.—Cleaning out and repairing the north drift on the 2100 level, which connects with the Savage mine at that depth, is making about 4½ feet per day, the heat being intense and progress necessarily very slow.

SILVER HILL.—At a point 440 feet north of the main east lateral drift, a crosscut has been started to the eastward, the face of which is in a fine quality of metal-bearing quartz.

YELLOW JACKET.—The north winze below the 2200 level is down 305 feet, following the slope or inclination of the ledge; bottom in quartz and porphyry, quite hard and dry. The new Yellow Jacket shaft is now down 1,467 feet.

JUSTICE.—Daily yield, 80 tons of ore. This ore is of as good or better a quality than any that has been extracted and crushed from the mine for the past two years. The south drift, on the 1300 level, is steadily advancing, the face showing good quartz, with spots of very rich ore.

CALADONIA.—Sinking the joint winze below the 1400 level on the Overman line has been temporarily stopped on account of the strong, steady flow of water at the bottom.

OVERMAN.—The east drift from the 1600 station is being pushed rapidly toward the ore vein. The east drift on the 1100 level is steadily advancing through a splendid body of quartz, which shows little or no ore as yet.

LADY WASHINGTON.—The ore stopes being opened on the south line on the 1000 level show the vein of paying ore at that point to be about 10 feet in width and of excellent quality.

CON. IMPERIAL.—Cutting out, enlarging and timbering the main north and south lateral drift is being pushed ahead with steady vigor, preparatory to a general crosscutting and prospecting of the entire ore vein on that level.

CROWN POINT.—The south drift from the bottom of the double winze on the 2300 level is being pushed vigorously forward to connect with the north drift, which will be started from the Belcher, to-day, on the same level.

ALTA.—The prospecting drifts on the 1350 and 1250 levels are being pushed vigorously ahead, to open up the ore vein, which, when accomplished, will lay bare a large portion of the ore vein ready, whenever it is desirable to do so, to commence the extraction of ore.

UNION CON.—The joint east crosscut on the Mexican north line is now in a distance of 356 feet, the face still in blasting porphyry, carrying lively looking streaks of quartz. It is now in a distance of 388 feet from the north line.

BULLION.—The east drift on the 2000 level is being again vigorously advanced, although it is necessary to use great caution, as the ground in the face of the drift is quite soft and difficult to sustain. The prospects of finding an ore bearing vein of quartz in this drift is quite favorable.

GOULD & CURRY.—Owing to an increase of the great heat in the south drift on the 1900 level, caused by the large amount of water in the main incline below the 1800 level, work in that portion of the mine has been abandoned until the main shaft is completed to that level.

CHOLLAR-COMBINATION SHAFT.—This shaft has attained a perpendicular depth of 2210 feet, the bottom being in hard blasting rock.

SUTRO TUNNEL.—Total length of tunnel, 19,766 feet. During the past week the heat has not increased in the header, but even the regular 100° may be considered pretty warm. The ground is hot and dry, but works well, better than last week. It is the regular Comstock ledge matter—quartz and porphyry with streaks of clay, and occasionally a bunch or feeder of low grade ore.

CHERRY CREEK DISTRICT.

THE MARY ANN.—*Independent*, May 25: A body of rich ore has been struck in this mine. The ore runs from \$65 to \$300 per ton, and has

been drifted along for a distance of 179 feet. The thickness, height and depth of the ore body is not known, but it is believed to be a most important development.

STRIKE IN THE PAYMASTER.—The mass of ore encountered in this mine below and to the west of the old clay chamber, proves to be the largest body of ore yet found in the mine, and is certainly far richer than any one body of equal size in the State.

ELY DISTRICT.

RAYMOND & ELY.—*Pioche Record*, May 18: Driving ahead in all the levels on which work is being prosecuted; there is no marked change to note either way. The work on the 12th, at the head of the winze, consists of excavating to place in the hoisting machinery. The prospecting drifts on the eighth and ninth are both looking very favorable. From 15 to 20 tons of ore being daily extracted. Mill running as usual, half on ore and half on tailings. Are excavating on the surface for the foundation for the air compressor.

MAYFLOWER.—There is an improvement in the bottom of the incline shaft, consisting of streaks of ore and general good indications. There appears to be a general improvement in the appearance of things in the mine.

DAY.—Nothing of special interest to report; same work going on in the tunnel and winze; the winze still in low grade ore, as has been reported for the last two weeks.

ALRS.—Work progressing in the mines of this company the same as in report of last week. Mill running regularly.

EUREKA DISTRICT.

ABOUT EUREKA.—*Sentinel*, May 25: The ore on the dump at the Hoosac, and now being developed in the mine, is free from refractory constituents, and is as good smelting ore as can be found in the district. The first instalment of 50 tons of flue dust went forward yesterday. About 6,000 tons will be shipped. Fair progress is being made at the Eureka tunnel. The face is in good working rock. The flow of water continues unabated. The Prospect mountain tunnel is now in 700 feet, the face being in hard limestone. The contractors are pushing work as vigorously as possible. The product of the Richmond furnaces is still largely in excess of the capacity of the refinery. There is enough crude bullion on hand to run the latter institution for the next four months. The recently developed ore body at the Industry is looking well, and promises to expand into a large deposit. Parties are examining property over in the Silverado district, with a view of investing. The Queen mine is the objective point. The first instalment of Gila bullion passed through Wells, Fargo & Co.'s office Wednesday last. It will be followed by frequent shipments. Work on the Bald Eagle mine is being carried forward vigorously. Considerable ore has accumulated at Mineral hill, and the boys are looking forward to the time when the mill will start up, and flush times begin. The ore shipments to Utah have been very light for the week past, although large quantities have been purchased by Salt Lake buyers. Considerable prospecting is being done on Hoosac mountain, and those holding locations in that vicinity are very sanguine of future developments. Furnaces will start up on Hamburg ore about the middle of June. The Eureka Con. Co. use 160,000 bushels of charcoal per month.

Arizona.

HUMBURG DISTRICT.—*Miner*, May 17: The Mariposa mine is full five feet between walls, all pay ore. Samples taken for an average and assayed, by Judge Walsh, give \$417 to the ton, at the depth of 20 feet. They have been in water rock for a distance of four feet, and find a considerable quantity of ruby silver. The ledge improves in size and richness below the water level; in fact, it has steadily increased from the surface down. The owners are confident that they have a good property. The Black Jack and Yosemite mines, near the Mariposa, are being worked. The Black Jack ore yields by mill process about \$400 to the ton; and the Yosemite, according to Judge Walsh's assay, goes \$325.97. There is a 22-foot shaft on the latter, showing a pay streak of from 12 to 18 inches at the bottom. The walls in all these mines are smooth and well-defined, indicating true fissure veins.

The Hassayampa hydraulic mining company own 1,000 inches of water and 160 acres of ground in Weaver mining district, about 50 miles from Prescott. The ground is loose yellow clay, and will yield from one cent to two and a half cents per pan, and is from 15 to 75 feet thick on a bed of cement gravel. They will bring the water through pipes for a distance of about three miles and a half, which will give them a fall of 140 feet. The company proposes to raise \$30,000 on their stock in the East, for a working capital.

Colorado.

CLEAR CREEK COUNTY.—*Miner*, May 18: Work on the mines here is active with fair prospects. On the Leavenworth mountain claims the Kirtley is considered about the most profitable as well as promising. Eleven men are worked on the day, and five on the night shift. The Colorado Central, the Equator, the Steamboat and the Brannigan are opening up with good ore and prospects.

THE BASSICK.—This mine is taking out more heavy ore than ever before. About 20 tons of ore, which will mill up in the thousands, is piled up in the shaft-house, and the supply of ore from the shaft is so tremendous, that the

large force of ore sorters have to work Sunday and every day to get the ore out of the way, and this from four men's work in the mine to the shift. Solid blocks of rich ore carrying sulphides, sulphurets and antimonial silver, heavy with gold, weighing 20, 30 and 50 pounds, can be seen on the floor of the shaft-house in great profusion. This mine seems to be inexhaustible.

Montana.

FRENCH BAR.—*Helena Independent*, May 16: Work has been commenced here with good prospects. In the first place, there is an abundance of water; and secondly, good use is being made of every drop of it. All the hydraulic claims are running full-handed, and although no clean-ups have been yet made this season the outlook is extremely favorable.

BEAVERHEAD.—Mining is flourishing here. Phil. Shennon is still taking out money with his arastra. Ore from the Dacotah is being crushed in the Carhart mill. Formerly this lode paid well, and present indications are favorable that it will continue to do so indefinitely. Mr. Kemp is operating a mill for Judge Meade at Elkhorn, but the snow being deep it has greatly retarded operations. In fact, there has been a goodly quantity of rain and snow lately in this section of the country.

New Mexico.

LAS ANIMAS.—*Grant County Herald*, May 11: Some of the gulch mining here will turn out fairly. In the Perchs River gulch pan after pan has been taken out, running 20 to 30 cents to the pan. Other gulches, to the number of at least a dozen, in the district, show gold in apparently the same proportion, but being without water no fair test can be made. It is estimated that two of the principal mines in the district could keep a 20-stamp gold mill in constant employ. Dugan has a 40-foot tunnel and two 40-foot shafts on the King proper. Breen, Winter and Clark have done much to develop the Argosy. They have in sight an eight-inch vein, the lowest assay of which shows \$65—and have turned out ore which is conceded to be the richest in camp. The Bobtail mine belonging to Pappin and Pitcher shows a three-foot vein and the last clean-up netted \$52 to the ton. A tunnel of 140 feet has been run on the Weeks mine. Yankie & Co. have a 100-foot tunnel in the King Extension, besides two shafts of 50 feet each. Other portions of the district are being rapidly developed, and no one now doubts the result. There are already 10 well developed mines in the district: the Centennial, Ready Pay, Weeks, Snake, Yellow Jacket, Argosy, Lilly of the West, Montezuma and Bobtail. To add to the value of the district, rich silver mines have recently been discovered in the immediate vicinity. This discovery was made by a Mexican who brought in specimens of the ore and had the satisfaction of hearing them pronounced by experts to be of high grade. He is now sinking a shaft and the ore improves as he goes down. Altogether Dona Ana county has reason to rejoice.

Utah.

SAN PETE.—*Salt Lake Tribune*, May 24: Quite an excitement has been raised among miners over the discovery of rich silver-bearing ore in San Pete valley. Choice samples of the ore from the surface assay as high as \$1,000 silver, a few dollars in gold and 20% copper. But the trouble is no continuous veins are to be found, the ore being discovered in small pockets and petering out at a depth of only a few feet, leaving no trace to follow. The character of the surface ground resembles that of Miller bill in American Fork, but it is believed that there is a large mineral deposit in the San Pets region as there is in American Fork.

THE EMPIRE.—This property of this company is situated in the Park on the westerly extension of the great Ontario vein, and consists of 14 locations. Work on both the O'Brien and Prince Oscar has been prosecuted during the past winter, and the first named of these now has a perpendicular shaft down 125 feet, while the latter boasts of an incline shaft of equal depth. Hoisting machinery has been purchased, we understand, and will be in operation at the mine within six weeks from this date, after which the work of development will be pushed forward with all possible vigor. The future of this enterprise is bound to be great; the success of the Ontario forebadows it. There is a great Comstock in the Park, and the claims of the Empire Co. cover a large portion of it.

MUSICAL BOXES.—The roar of the great May musical festival will not drown the sweet melody which is poured forth by the musical caskets of M. Paillard & Co., 120 Sutter street. These little gems of harmony, made by a branch of the firm in Switzerland, and sold in San Francisco by the makers, are unequalled in their construction and performances. They are elegant articles for presents to friends, and they are charms to possess for oneself. They amuse by their wonderful power, and they soothe and instruct by the faultless execution of the finest musical airs. The excellence of the instruments is sufficiently attested by the high awards which have been made to them by world's fairs and local exhibitions, and they commend themselves to all who come within the sound of their trills and cadences. M. Paillard's establishment at 120 Sutter street, should be visited by all who come to see the sights of the city.

News in Brief.

THERE were 82 deaths in this city last week. A THOUSAND Chinese fishermen are operating at Point San Pedro, San Pablo bay.

HALF a million orange trees are growing at Riverside, Los Angeles county.

A CAR-LOAD of eggs from the East has arrived at San Francisco.

MOHAIR in considerable quantity is being shipped from southern Oregon to this city.

A WATER-SPOUT burst at Barrington, a suburb of Chicago, killing three persons.

UTAH potatoes are selling in Deadwood at five cents a pound.

THE prices of both government and railroad securities have improved lately in the East.

A TREE at Marysville, nine years old and 11 feet high, upon which there are 1,100 oranges.

THE trouble among the settlers in Tulare county in regard to railroad lands continues.

A TON of honey was received at Los Angeles, last week, from the bee ranch of Butler & Co.

JAMES GORDON BENNETT won \$60,000 betting on O'Leary's winning the great walking match.

THE bill creating the Territory of Oklahoma has been agreed upon by the House Committee.

By the jumping from the track of a train at Dutch Flat last week, six cars were wrecked and Charles Cassidy, a brakeman, killed.

GOV. HARTRANFT, of Pennsylvania, has appointed delegates to the International Prison Commission at Stockholm.

THEY have had destructive floods at Deadwood in the Black Hills, also at Denver, Colorado.

THURLOW WEED pronounces Moody the greatest preacher that has appeared since Paul's time.

THE famine in China is pressing upon 15,000,000 of people, while 60,000,000 are suffering more or less distress.

NARCISSE, a Frenchman, shot himself at Pleasanton in the mouth, causing instant death. Cause unknown. He leaves a wife in Paris.

THE baker at St. Vincent's Orphan Asylum, at San Rafael, committed suicide by shooting himself one day last week.

HENRY ROBERTS (colored) was hanged at Shelby, N. C., last week, for murder. He died protesting his innocence.

ALEXANDER H. STEPHENS announces himself as a candidate for re-election from the Augusta (Ga.) District.

THE total receipts of the Cincinnati musical festival amounted to \$67,500; the expenses, \$40,000.

SEVEN large mills at Fall River have stopped for a week, and in a few weeks all the mills will probably run only half time.

IN 1850, the length of the railway lines all over the earth was only 19,000 miles; in 1875, it had increased to 200,000.

A LARGE mass meeting of the Socialist Labor Party was held in New York, May 25th. Addresses were made in English and German.

THE Free Labor Exchange last week found employment for 94 persons, of whom 75 were men, and 87 of them were sent into the country.

THE Maxwell land grant in New Mexico contains over 60,000 acres of coal lands, in which the average thickness of the coal bed is six feet.

CAPT. J. B. MOORE, formerly of this city, now a ranchman in central Nevada, will be a candidate for Lieutenant-Governor in that State.

JOHN BRIGHT said in a recent speech at Rochdale that one-third of the whole land of the United Kingdom, being no less than 23,000,000 acres, belongs to 935 men.

MOSES, chief of the Northern Indians, says he desires peace with the whites. The people of southern Idaho are fearful of trouble with the Bannock Indians.

JUDGE HOFFMAN has decided that the \$19,821.55, recovered from the wreck of the steamship *San Francisco*, belongs to the party of divers who secured it.

THE Pennsylvania State militia is rapidly being placed on a war footing in anticipation of labor troubles at Pittsburg and in the coal regions.

FRANK DALY fell off a freight train near the American river railroad bridge on the evening of the 23d ult., and 20 cars passed over him. He died in a few hours.

On the 11th of April a tornado swept over a portion of the city of Canton, China, destroying 9,000 houses and causing the death of about 10,000 persons.

THERE is an exhibition at the Paris exposition a silver set manufactured by Tiffany & Co., of New York, for John W. Mackey, that cost \$200,000.

OPIMUM smoking is rapidly increasing among the white men and women of Virginia City, who visit the Chinese quarter day and night to indulge in this disgusting and hurtful practice.

THE late tornado in Wisconsin turns out to be more destructive than was at first supposed. Thirty lives were lost and nearly 100 people injured in a single county, besides a vast amount of property destroyed. The track of the storm was from a quarter to half a mile in width and extended over several counties.

STEWART's hotel for women, which was opened not long since in New York, is said to have proved so much a failure that it is to be transformed into a general hotel, the number of boarders having dwindled down from 60 to 15, while the expenses are \$700 daily.

OVER 500 Chinamen arrived lately at Portland, Oregon, direct from China. Great numbers of these people are entering the mines of Oregon, Idaho and Montana, by way of the Columbia.

MORITZ MARKS was drowned last Sunday while bathing at North Beach.

NEW YORK brewers are sending beer to Germany.

Of the 2,500 doctors in Philadelphia, 500 are homeopaths.

THE cars are again running between Vallejo and Sacramento.

LAST month \$2,470,000 of the new silver dollars were coined.

PROF. MARTIN made another successful balloon ascension on Sunday last.

THE Chinese butchers in this city are being arrested for keeping their shops open on Sunday.

THE improvement in the iron trade is thought to denote an amendment in business generally.

ACCORDING to the Yuma *Sentinel*, the condition of Indians on the Colorado reservation is truly deplorable.

IT is rumored in Cheyenne that four companies of cavalry will leave Fort Russell shortly for the Big Horn country.

OKAES AMES was supposed to be worth \$15,000,000 when he died, but the estate will not pan out over \$25,000.

GEORGE FOZARD and Edward Drummond were drowned on Sunday last by the upsetting of a boat off Angel island.

THE citizens of Chicago are arming against apprehended disturbances from the Communists.

THE Russian government is negotiating with the Boston Iron Company for the manufacture of heavy ordnance.

PERALTA accomplished his feat of riding 305 miles in 15 consecutive hours at Fleetwood Park, New York, in 14 hours and 31 minutes, having 29 minutes to spare.

A TERRIFIC rain-storm and flood occurred in Colorado lately, doing great damage in Denver, and on the railroads in that section several lives were lost.

FOUR camels, three young and one old, have been running at large near Mineral Park, Arizona. The old one is supposed to have been one of the 30 brought over in 1855 at the expense of the government. They live on cactus and sage brush.

Nevada County Mines.

Mr. W. Rose, who has just returned from a trip through our California mining districts, furnishes us with the following notes:

Although for a long time dazzled with results of the silver mines of the Comstock, which have diverted such vast amounts of California capital into the State of Nevada, which if invested in the gold mines of California would have shown far richer results, our people are at last coming to realize that it takes two gold mines to run one silver mine, and are commencing with new energy to look after our California gold mines, which have been for a series of years quietly, but steadily, putting money into the pockets of their owners, and adding millions to the wealth of our State.

It is believed that in proportion to the amount of capital invested in their development, the quartz mines of Nevada county in the immediate vicinity of Grass Valley and Nevada City can show richer results than any similar area of mining ground in the world.

Under the prudent and practical management of Mr. Coleman, the Idaho mine has paid 154 dividends, ranging from \$7.50 to \$22.50 to a share. The Providence, Empire, Gold Hill, New York, Greenhorn, Washington and Champion are also being worked with the same flattering results, which if coming from the silver mines of the State of Nevada, instead of the old gold mines of Nevada county, California, would create a sensation in mining circles in San Francisco. The Champion, which is an extension of the Providence and a consolidation of seven different locations, and into which a tunnel has been run for 350 feet, has developed an immensely rich ore body. The Branch Mint, Victoria and the O'Conner, mines upon the resumption of the work, also add greatly to the wealth of our State. While millions have been sunk in mines outside of our State by citizens of California, the mines mentioned above have thus far been successfully worked without appeals to our capitalists or aid from the San Francisco Stock Boards.

STANDARD GEOGRAPHICAL NAMES.—According to Professor Hayden, U. S. Geologist, the future schoolboy will be put to his wits ends to follow out our geographical points in the Great West. There seems to be a scarcity of names and a multiplicity of objects; in consequence of which names are duplicated right and left. Thus, we can find almost any number of "Pyramid Peaks," "Round Tops," and "Bald Mountains," and "Crooked Creeks," and so on, which is all extremely confusing, where identification is necessary. Professor Hayden suggests that the general government issue a map of the country, which shall exclude all duplicates, adding new names for old ones discarded, and which shall become standard authority for our geographies.

NELSON BUSH and a man named Johnson got into an altercation at White Pine the other day, when the latter discharged a pistol three times at his antagonist, shooting him through the hand. Bush then got hold of the weapon and shot Johnson dead. Cause of the trouble, cards.

THE ENGINEER.

Guarding Chimneys from Lightning.

Tall chimneys of manufactories and mills often invite the lightning stroke in places where thunder storms prevail. How to guard them was lately discussed, by Mr. Morrison, before a foreign engineering society. It was his belief that half the chimney conductors in existence are really more dangerous than serviceable. The mischief done by lightning is caused by its determination to force a passage to the earth through bad conductors, such as stone or brickwork. There can be no danger in the case of good conducting bodies with proper earth contact, excepting they be too small. Then the damage will be probably confined to their injury by heating or destruction by melting. Lightning, when it strikes, takes the course to the earth which offers the least resistance, which, in a properly protected chimney, is, of course, the conductor. This it passes quietly down and leaves the chimney itself untouched. I had been in the habit of using insulated copper ropes, till I erected the "Atlas" chimney, when I went in for one of Sanderson & Proctor's three-quarter by one-eighth inch copper taps, attached to the chimney with ordinary staples, which I now consider a very good and convenient form of conductor. The important thing, however, is not so much the form or the insulation of the immediate supports as to see that each terminal is in order. This should, in spite of any little inconvenience, be ascertained personally. The upper terminal rod should be attached to the chimney cap, if a metallic one, and its lower extremity in perfect continuous connection with the rope, rod or tape. Its upper end should project a few feet over the chimney summit, and should be spread out into or be provided with a number of points. The earth terminal should first be threaded through one or more lengths of cast-iron pipe, and then attached to a large piece of old metal, carefully imbedded in the damp soil. The pipe is merely a provision against the injury or corrosion of the buried portion of the rope or tape. This, I think, all that need be said about conductors. The great danger is when, as is frequently the case, the connections are broken, and the rope is allowed, perhaps for months or years, to flap idly about in the wind. To reduce the danger of this, I have sometimes thought of inclosing a wrought-iron tube or rod within the substance of the brickwork, but the idea is one I have not yet carried out. Its advantage, besides that of protection from the weather, would be in its perfect straightness. The efficiency of external conductors is, I fancy, frequently marred by their being closely bent to conform them to the intricate angles and curves of caps and cornices. And now just a word about flues. As gaseous, like liquid, currents cannot turn sharp angles without making a fuss, corners in main flues should be persistently avoided and gentle and regular bends substituted. All tributary junctions likewise should, without exception, be inclined towards the direction of the flow, so that branch currents may be enabled to peacefully and calmly merge into the general stream.

Building a Railway Pier.

A writer in the London *Mining Journal* gives a description of the construction of the Huelva pier of the Rio Tinto railway, as follows: The total length of the pier and of the approach from the station yard was 2,444 feet. The screw pile portion was 1,900 feet long. The distance was made up of 29 spans of 50 feet each, and 30 groups of cast-iron screw piles and columns, eight in each group, placed 15 feet apart from center to center. The pier-head, alongside which the ships were moored, was protected by the shipping deck wharf. This wharf was independent of the cast-iron piling, and composed of creosoted red wood Memel fenders supported by creosoted Memel piles, cross bearers, transoms, and longitudinal wallings. The face of the wharf opposite to each span was close-sheathed with timbers, measuring 12 inches by 6 inches, for a distance of 50 feet, the remaining portion being protected by vertical fenders placed at intervals of three feet from center to center. The depth at low water spring tides at this wharf was 15 feet. There were three floors at different levels throughout the length of the pier, and upon these were laid seven lines of rails. These floors were carried upon wrought-iron lattice girders four feet deep, and were supported by the screw piles and columns. The cast-iron hollow screw piles were 16 inches in diameter, and the lowest length of the pile shaft was fitted with screw blades five feet in diameter and having a pitch of six inches. The principal difficulty was the want of solidity of the foundation, which proved to be worse than was at first anticipated. With two series of lines, one above the other, a greater load had to be borne than if the pier had simply to carry the work of the mines. It was found that the screw piles alone would not give sufficient area of base unless considerable expense was incurred in construction. It was therefore decided to provide additional bearing surface by the introduction of timber platforms, fastened to the piles by cast-iron discs, which clamped the respective piles below a collar cast specially on the pile shaft, so as to rest upon the disc. In this way the load on the pier was transmitted through the columns, piles and

discs to the platforms, which rested on the bed of the river. The platforms at the shore end were weighted to 300 tons, and those in the deep water section to 500 tons. When the loaded platforms ceased to sink, a diver was sent down to fix the discs forming the connection between the piles and the platforms, and the load was then removed.

Maryland and Delaware Ship Canal.

In the Senate recently Senator Whyte asked for an appropriation of \$5,000 for surveys across the Eastern shore peninsula, to ascertain and report upon the best route for a ship canal to connect the waters of the Chesapeake with those of the Delaware. Baltimore has for a number of years urged a project of this kind, and has anticipated great commercial benefits from it if carried out. An effort was made in this direction in 1872, and the Maryland Legislature of that year passed an Act incorporating the Maryland and Delaware Ship Canal Company. An attempt was made in 1874 to get from the State of Maryland an appropriation of \$20,000 to make surveys, but it failed. A similar charter to that above mentioned was granted to the same company by the Delaware Legislature about the same time. The charters per-

A PERFECT RESERVOIR.—A writer for the London *Mining Journal* gives a description of what he calls a perfect reservoir. It was constructed for the storage of water near Maidanpek, in Servia, to supersede the use of two steam-engines which were used at the Servian Copper Company's mines—thereby saving a considerable monthly outlay in fuel, labor, etc. It is formed by an embankment, faced by a wide wall, put across a valley. The wall is about 60 feet high, substantially built, and water-proof, backed inside by beaten earth in the usual manner. The sheet of water impounded is about half-a-mile in length, of variable width, at the deepest point 50 feet in depth. The area is about 29 acres; quantity of water, 93,000,000 gallons. It is usual to place the conducting pipe in the center of the embankment. The engineer in this case did not do so, nor use any pipe; but he cut a tunnel into the rock by the side for the discharge of water, through a valve, in a well, which is also the overflow. What I wished to remark on is the very perfect execution of the work. Most reservoirs known to me have been found when first used to be leaky, requiring supplemental expenditure of money—sometimes large sums—to make them perfect retainers of the water; and in many cases the embankments have yielded to the pressure of the water, caus-



LEAVES AND BLOSSOMS OF AUSTRALIAN BLUE GUM, (Eucalyptus Globulus)

mitted the company to start the route of the canal from any point on the Chesapeake bay or its tributaries, from the Sasafas river southward. The route proposed by the company is by way of the Sasafas river, across the peninsula, to the Delaware river. If this route should be adopted it would simply be a rival canal to the Chesapeake and Delaware canal, and would run parallel to it at a distance of not more than 10 miles. The canal, if constructed as proposed, would be 40 feet wide at the bottom, and 60 feet wide at the top, with a depth of 21 feet below low tide. Such a canal would not be a ship-canal; and, it is claimed, would not be of any advantage to Baltimore. The idea of Senator Whyte is to have a canal constructed which will complete an internal water-way to the West and Northwest, and which will accommodate the naval vessels of the United States.

ISTHMUS OF DARIEN CANAL.—It is about 30 years since a ship canal across the Isthmus of Darien was first projected, and at last the United States of Colombia have got so far as to grant a concession to the Inter-oceanic Canal Company, which requires the determination of a plan within three years. A company must be formed within two years afterward, and the work completed within 18 years more. The concession is for 99 years, at the end of which time, in the year 2000 A. D., the property will revert to the Colombia government, provided the individuality of that Republic has not been lost before that time by annexation with the United States of America, or some other progressive nation.

ing great destruction of life and property. In the present case the embankment and wall were put to a very severe test by a flood which occurred about 12 months ago. The stream was such as to bring down trees and shrubs, which shunt up the overflow, thereby causing the water to flow over the then unfinished embankment and wall 18 inches in depth, but without doing the least damage to either. To show the perfection of the wall, etc., I can say that not a drop of water found or finds its way through. It is of great importance to Maidanpek that the embankment should be very secure, because its failure would involve the demolition of nearly the whole of that village, which consists of nearly 400 dwellings.

ANCHORING TIMBERS.—A writer for the *Polytechnic* suggests a way to anchor down timbers on rock. In brief, the plan is to bore the timbers and the rock, and let in a piece of iron gas-tubing the exact size of the hole; the lower end being expanded in the rock by driving it over a double taper-plug, which is put in at first. The upper end is expanded by a taper-plug, and hammered down flush with the timber. "The cheapest way to get them out is to saw them off and leave them in."

EFFECT OF THE EADS JETTIES.—The shipment of wheat direct from Iowa to Liverpool is an interesting fact. An article on page 11, from the *Davenport Gazette*, gives an account of such a shipment, on terms so low as to defy the competition of any other line.

The Eucalyptus as a Honey-Producing Tree.

Our engraving on this page shows the leaves, twigs, blossoms and seed capsules of the *Eucalyptus globulus* or Australian blue gum. There may be seen the two styles of foliage, the wide opposite leaves which come earliest in the growth of the tree and the long, narrow and pointed alternate leaves which appear afterward. There is also shown the beautiful blossoms with its myriad anthers. About the center of the engraving is the seed capsule, one half cut away, so that its internal structure appears, and lower down is one of the capsules turned toward the eye so that one can look into its capacious cup. All these points are of interest, because our Eastern readers who have never seen the tree which they read so much about, may gain a good idea of some of its parts. In this State where the general appearance of the tree is so familiar to all, the engraving will have a special interest, because it is made to represent the points which will be claimed for the tree as a honey producer.

We are indebted to a contributor of the *Press*, who signs himself "U. K. Lyptus," for an interesting statement of the adaptations of the tree to the apiarian, and that which follows is from his pen:

For all this climate is unsurpassed, the Heaven's sometimes, as last year, fail to supply copious rains to insure a sufficient and lasting crop of honey-producing plants. In the great honey-producing counties of this State forest trees from which honey is obtained are wanting. In the Eastern and Western States many of the trees growing in the forest and by the wayside yield an excellent grade of honey. On this coast, and especially in California where trees make such rapid growth, how easy it would be for the apiarian to set out an artificial forest of honey-producing trees.

What will be the best tree to plant that will make a rapid growth, be useful for fuel and building, and above all yield the most honey in our dry climate? We know of many trees that furnish nectar, none of which succeed so well in our State as the eucalyptus family. To give the history and culture of this class of trees in these columns would be unnecessary, for the pages of the *RURAL* for years back go over that ground sufficiently. The subject of the eucalyptus as a honey producer has not been so fully considered.

The different varieties of the gum bloom at such times when all other kinds of flowers are out of season, and the more so during a dry year when the crop of honey-bearing animals is cut off. The *Eucalyptus globulus* commences to yield nectar about the middle of December, and continues to do so for about five months. During that time the bees seem almost to swarm upon it. It is perfectly astonishing to hear the industrious insects in the very middle of winter merrily humming their gentle tune at a dizzy height amid the swaying branches of some tall gum tree. There can be seen the beautiful yellow-banded Italian and the dusky black, also the white or silvery albino, a hybrid, perhaps a bumble bee, with also a yellow jacket, each and all peacefully drinking out of the same cup. Did any one ever see such warlike "creatures" of different "castes" gathered together so sociably for the one purpose? What other plant or tree could be set out that would offer such friendly shelter and "commercial" inducements to the insect world? Not only do bees find "pastures new and fresh" in this tree, but ants and butterflies participate in the grand open-air banquet. Birds also find an agreeable shelter in the pendant branches of the tree. We would have said a peaceful and fragrant pleasure would be their lot; but, as we have learned from a friend in Los Angeles, the little humming bird will not venture near a tree while in bloom, for the bees will not tolerate any of the feathery tribe on or about it. Woe to the bird that will be so presumptuous as to attempt to alight on its branches. A dozen, nay, a hundred well-poisoned darts will at once be dispatched to slay the intruder. We have found that in a year of plenty bees when at work are not so apt to molest birds when seeking shelter in the foliage of this tree.

The second variety of eucalypti to be considered is what is known as *rostrata* or *iminalis*, or more commonly called red gum. This blooms from the middle of August to about the second or third week of December. It is undoubtedly the most important of the lot, for it comes in at a time when other flowers are scarce, if not disappeared altogether. The bee finds abundant nectar in its flowers to keep them from starvation. The tree is of rapid growth; flowers small and numerous.

Another variety of eucalypti of the iron bark species, of slow growth and flowers twice a year, is sought after by the honey bee. It blooms in June and a second time near the end of December. A fourth variety blooms from July to September, and November to January; but as the tree is slow in making any headway it is not to be recommended for planting by the beekeeper.

Many more desirable kinds of eucalypti are enumerated in the catalogues and works on Australian plants. So far, out of the many kinds successfully introduced into this State, the above are the best suited to the wants of the bee master.

The honey obtained from the eucalyptus is "highly" aromatic, and is said by trustworthy

persons to possess medicinal virtues. It is dark in color, fragrant and a little peppery to the taste. On the whole it will, for its rich dark color and medicinal properties, always find a ready sale. Prof. A. J. King, of the *Beekeepers' Magazine*, in acknowledging the receipt of a sample of honey gathered from the *E. globulus* during the month of December, 1876, and sent to him by the writer, says that "it resembles, in many respects, the honey accompanying the queens we receive from the region of the Alps in Italy." He also mentions the peculiarities of the honey as given above.

Australia furnishes the best illustration of the great productiveness of the gum as a honey-yielding tree. In that country and adjacent islands there are about 100 species of this tree. They constitute 99 of the forest vegetation. The native bees of Australia, as well as the imported, which have multiplied rapidly, take up their abode in the hollow trunks and branches of the trees and gather large quantities of delicious honey from the eucalyptus. A swarm never dies there for the want of provisions; there is an unlimited supply always ready to be collected.

We know of no tree that yields nectar in greater quantities. Hives that were most emptied by the first of December have been by an industrious colony filled to overflowing by the first of January.

In order to collect the honey from the winter-flowering eucalyptus it is necessary that there should be a strong swarm in the hive. To maintain this it is not only expedient to have plenty of honey but also a good prolific queen and a fair supply of bee-bread or pollen. All bee-bread required for brood-rearing can be obtained from any of the varieties named. It partakes of the color of the flower and is gathered by the bees in the early part of the day.

Bees can be noticed working on this tree at all seasons; even on and after a light shower of rain or when a heavy fog has cleared away, the ever industrious bee can be heard away up amid the fragrant blossoms of the eucalyptus. This shows that a change in the weather makes none in the flow of sweets, and that the industrious insects (ants not excepted), always have an opportunity to be busy, rain or shine.

A very interesting incident illustrative of the partiality insects have for this honey has been noticed by us. Prior to the time of the blooming of the gums, under and around the dwelling house, were to be seen thousands of ants. They congregated under everything. Even the inside of the house was infested with this troublesome pest. Just then the *E. rostrata* opened its flowers, and when this tree was found by the little ants to be in bloom they deserted the house and everything about it and transported themselves to the base of the various red gum trees about the place. There they took up their harbor in the cracks in the ground. From that time a black streak could be seen extending up the side of each tree in flower. Ants were climbing up unloaded, while, going in the opposite direction, they were coming down weighted with nectar taken from the greatest honey challenge known among the bee-flora.

In addition to the honey yield of the blossoms, the eucalyptus will serve the apiarian as a wind break; it will furnish him fuel and lumber for hives, stands, boxes and buildings. The dried leaves furnish excellent fumes to the smoker.

We have satisfied ourselves that the eucalyptus is indispensable around an apiary, and we hope others will investigate the matter to their own satisfaction.

Sensations on High Altitudes.

To those in the enjoyment of ordinary health, says the *Rocky Mountain Tourist*, the sensation experienced in crossing the ascending elevations of the great plains and in the higher altitudes at the base of and within the mountain, are, in a notable degree, pleasant. The dryness and rarity of the atmosphere, together with its remarkable electrical effects combined with numerous other peculiarities of climate, excite the nervous system to a high degree of tension. The physical functions are aroused and re-energized, it may be even after years of sluggish, inefficient action. New vigor and tone is imparted, the appetite is keen, the digestion is capable and strong, and the sleep sound. The vital organs, stimulated and compelled from an established routine of greater or less inefficiency, it results that all those lurking ailments to which men in the ordinary pursuits of civilized life are too much subject, at once disappear, and whatever there is to each individual of capacity to enjoy is summoned into fullest action, and one fairly revels in the intoxication of good health. Such are the sensations accompanying the first entrance into the rarified electrical air of these elevated regions, which, with their attending pleasures and benefits, will forever render the Rocky mountains a resort of unequalled allurements for those who, not invalids, yet seek relief from the exhaustion and deterioration of overworked professional or business life.

GOING FOR THE RED MEN.—Every indication now seems to point to a large expedition to the north this season on an Indian hunt. General Crook is a man who keeps his projected movements to himself; but the opinion of military men is that the coming season will witness a large force sent into the field, the abandonment of several old, unnecessary posts, and the establishment of several new ones at more exposed points on the frontier. —*Laramie Sentinel*.

Useful Information.

The Paris Exhibition.

The French International Exhibition of 1878 was inaugurated by President MacMahon on Wednesday, May 1st, with an *éclat* which has given joy to the Parisian heart and has chastened the opponents of the Republic in proportion as it has afforded felicity to its upholders. Every way the opening was auspicious, and the response of the nations invited to exhibit has been so cordial that success is assured, should no untoward calamity appear to frustrate the efforts of the promoters. In consequence of the unexpected demand for space, the area originally contemplated for the exhibition has had to be increased by one-half. The time taken to construct the buildings and arrange the exhibits, so far as they were arranged by the opening day—and that was an appreciable way from completion—was 20 months. The last exhibition, that of 1867, occupied the same site as the present one, but it only extended over the Champ de Mars, on the left bank of the Seine. The Trocadero was not utilized. This time, however, that slope on the right bank has been turned to account by the erection of the Trocadero Palace, which consists of an immense concert-hall, with wings extending on both sides, in a free imitation of the Roman architecture of the eleventh and twelfth centuries. The concert-hall is flanked by two towers, the summits of which will be the highest points in Paris. The mid-building, the bulkiness of which the high flanking towers serve to tone down, is surmounted by an elegant bronze figure of "Victory," with expanded wings and drapery raised by the wind, the work of M. Antonin Mercie. The concert-hall is 30 meters in diameter and is estimated to seat 6,000 persons. On the outside the Palace of the Trocadero is adorned by a cascade of water falling from a height of 26 or 30 feet into an ornamental lake, round which extend the elegantly laid-out grounds, in which figure many striking sculptures by well-known artists. This vast building and its grounds will survive the exhibition. As to the Exhibition proper, a temporary building in the Champ de Mars, on the 1867 site, it is approached from the Trocadero by the Point de Jena, which has been widened and extended so as not to interfere with the ordinary traffic. In front of it are beds of rhododendrons, grass plots, statues, fountains and conservatories. The terrace is 280 meters in length by 20 in width. At intervals are placed gigantic sculptural figures, symbolizing the principal participants in the exhibition. There are three porticoes. The central one leads to the grand vestibule, the right side of which is allotted to England, and left to France. The main avenue is devoted to works of art, the exhibits of the Paris Municipality occupying the center of the building and the French crown jewels being placed at the southern extremity. As to the arrangement of the groups, the visitor desirous of comparing the production of different countries in a particular class, will not have, as in 1867, to make a circular march, but will have to proceed longitudinally. The eastern avenues are assigned to French machinery and French productions, the western to foreign productions and foreign machinery; but the machinery has overflowed into a number of annexes. Each nation has been allowed its own architecture inside the building, the result being a great variety of styles. The English erections occupy a much larger space than that placed at the disposal of any other foreign State.

WASHING WINDOWS.—It is not an easy thing to wash windows so that they will look clear and well polished, and if soap-suds are used, it is quite impossible to do it. The old-fashioned way of taking out all the windows, and washing them in soap-suds, and setting them aside to dry, after the suds have been rinsed off, is, to be sure, the easiest way of cleaning them, but it is also the worst way to make them look clear and bright. First brush them off well with a sponge or brush that comes for the purpose, and then wrap a bit of cloth about a sharp-pointed stick, and wipe out the dust that adheres to the corners, then take some weak tea, boiling hot, and add to it a tablespoonful of alcohol and a few drops of aqua ammonia, or a bit of carbonate of ammonia, the size of an English walnut. Dip a piece of sponge or old flannel, or of old cotton flannel, into it, and rub the glass one way only until it shines clear. Wipe it off with another cloth, rubbing it until well polished. Newspapers used to be much better than any cotton cloth for washing and wiping windows and mirrors, but now that the paper is chiefly composed of wood pulp, they are the worst things that can be used, as they cover them with a linty substance.

TO WASH GREASY WOOL.—Dissolve a large tablespoonful of borax in pint of boiling water. Mix one-quarter of it in the water in which the wool is to be washed. Put in one piece of goods at a time, using soap if needed, and if necessary add more of the borax water. Wash well and rinse in cold water, or in water only slightly warmed. Shake well, and hang where the goods will dry quickly. For 26 years I have used for washing my white flannels water about as hot as would be used for cotton clothing. My flannels are beautifully soft as well as white. I never have any shrink.

DRY PLATE DEVELOPER.—Our photographers may be interested in some statements made by M. Queval in the *Bulletin Belge*: When a dry plate is coated with a preservative principally or entirely consisting of gallic acid, it can be rapidly developed by the following solution: Distilled water, 100 c. c.; crystallized silver nitrate, 4 grammes; acetic acid, 4 grammes. Place the plate, film downwards, in a trough of rain water, so as to moisten the whole of the film without unequally removing the preservative, then pour all over it the above solution; the picture will quickly appear, and will generally be quickly developed. It must be carefully watched, and washed as soon as it seems to be sufficiently intense. All photographers who are in the habit of developing dry plates have observed that when too much silver nitrate has been added to the developer, the intense blacks of the negatives were riddled with small holes. The formula which I have given above does not produce this result, even though the proportion of nitrate be much larger; the reason of this apparent paradox I am not in a position to explain. I have only tried this developer with stereoscopic positives on albumen or albumenized collodion, and I am bound to add that I have obtained very unequal results. I therefore introduce it to public notice with some hesitation, though I believe that by washing off the preservative and by modifying the proportion of the ingredients, a very rapid and energetic development will be obtained.

TO RESTORE OLD, FADED AND ILLEGIBLE WRITING.—The restoration of writing that has become faded and illegible can be accomplished quite satisfactorily, where the ink employed has been an iron ink, by one or the other of the following methods, which are suggested by V. Bibra: Moisten the paper or parchment with a solution of sulphide of ammonium, applied best by means of a brush. Remove the surplus sulphide by rinsing it in water, and dry the document by pressure between sheets of absorbent paper. Writing restored in this manner, however, is disposed to fade again after the lapse of several weeks. A better plan, recommended by the same writer, is to apply, in the same manner as above, a concentrated tannin solution, which is then to be removed by washing in water, and the document dried as before. Writings thus restored show no disposition to lose their intensity for a number of months. The above recipes, are of course, only applicable to iron inks.

GOOD HEALTH.

The Treatment of Bleeding Wounds.

It is now a time of especial activity in the use of machinery and edge tools, both in the shops and on the farm. A few words about the treatment of wounds may be valuable. Dr. C. H. Allen makes the following suggestions: Bleeding is attended with more or less danger. All should observe the difference between arterial and venous hemorrhage. If the blood flowing from a wound is of a bright color and jets out, it shows that an artery, leading blood directly from the heart, has been wounded, and should receive instant attention, lest the sufferer should bleed to death. If the artery be very small, compress it firmly, and it may contract upon itself and the bleeding cease. But it should not be left without a continuous pressure in some form, either directly upon the tube or above it. The usual way is to bring a strip of linen or cotton cloth tightly above the limb till the bleeding stops. The artery may be larger and then the same treatment may be proper, till a surgeon may seize it with a pair of forceps, draw it out and pass around it a strong thread, or ligature of waxed twine or silk. A cut artery can never be absolutely safe unless a ligature has been securely tied. The mode of tying a ligature is of some importance. The ends of the threads should be passed around each other twice, and then drawn tightly. This prevents slipping of the thread, and secures a complete check to the flowing of blood. These directions are important, because the life of the wounded person often depends upon the prompt and proper application of a ligature. In every agricultural school instructions on the proper mode of treating all sorts of wounds should be given. And every man who uses instruments should be familiar with the proper way of dressing wounds instruments may possibly inflict. The most cautious men are now and then careless in using sharp-edged tools. A young man was mowing. He unintentionally disturbed a nest of hornets. They returned the compliment by addressing him in a pointed way. He stumbled, and inflicted a wide and deep wound upon the calf of his right leg. His brother, then present, tore his shirt into strips, tied knots in the middle and brought some about the leg above the knee, bringing the knots under the knee more and more firmly, till the hemorrhage ceased. Two other men were mowing, when one carelessly hit the other with his scythe just above the inner ankle. The blood jetted out freely. The inflictor of the wound ran for help, and on his return found the wounded man had bled to death. Very slight pressure upon the bleeding artery might have saved his life. When one can, press the bleeding artery against the bone above the wound. The services of a surgeon are desirable, but an hour may elapse before he can reach the wounded person, so every one

should be familiar with the simplest way of checking the bleeding from a wound.

If the blood flowing from a wound be dark colored, oozing slowly in a steady stream, but not jetting, as when an artery has been cut, it can easily be checked in the same way. Bleeding from a vein may cease by applying cold water, by holding the injured limb higher than the head. If the lower limbs be cut severely and the blood flow freely, place the sufferer on the ground or floor, raise the limbs upon a chair, apply a bandage firmly about the limb or limbs, and keep it saturated with cold water. By observing these directions many lives have been saved.

We have seen friends, upon receiving a severe cut use a large quantity of rags, as if concealing the blood was stopping it. The compression of knots brought firmly against the bleeding artery just above the wound is worth all the rags of the known world.

The Preservation of the Voice.

In a recent lecture, in New York, on the "Hygiene of the Voice," Dr. Ward said that there are many agents which more or less influence the voice, the four principles of which are climate, dress, diet and exercise. Change of climate will undoubtedly for a time exert some slight deleterious influence on the larynx, but this influence is greatly overestimated. All clothing should be loosely attached to the body. The present fashionable style of dress is decidedly unhealthy. The chest and abdomen are unnaturally confined, the lungs and other organs thus being prevented from acting in a normal manner. The dress should be worn high in the neck, and the sensible female artists avoids as much as possible appearing on the stage in full dress. The throat should not be wrapped in comforters, hoas, etc., chest protectors should not be worn and the feet should be guarded against wet. Food supplies nourishment and warmth, and the article of diet which has the special property of producing heat in the body is fat. The diet of the singer should be bland as well as nutritious. Of the different kinds of meat, venison, turkey, roast beef and lamb are the easiest to digest. Cooked vegetables, unless too highly seasoned, are easily digested; cut cabbage, cucumbers and such like should be avoided. Pastry should be invariably discarded. Dinner at noon, followed by a light tea at nightfall, is a rule which, if rigidly adhered to, will be a safeguard against all ordinary attacks of indigestion. In order that acts of singing be properly performed, it is absolutely necessary that the stomach be nearly empty. Alcoholic beverages should not on any consideration be indulged in by vocal artists.

For the proper development of the vocal chords there are several rules which must be observed. The exercises must be regularly and systematically practiced; they must always be within the register; they should never be pushed to the point of fatigue; they should never be made use of when the vocal organs are attacked by cold, no matter how slight, and they should be practiced while standing upright, so as to allow of free play of the lungs and accessory vocal organs. Bodily exercise is especially beneficial to the singer. In concluding his lecture, Dr. W. said that learning to sing correctly is learning to be healthy.

The Causes of Sleep.

What are we to say as to the cause of sleep? It is very easy to catalogue the predisposing causes of sleep, but most difficult to speak with confidence concerning the direct ones. The first and most general predisposing cause of sleep is a negative one. It consists in the absence of everything that stimulates the senses or oppresses the mind. Darkness or the absence of light, silence or the absence of noise, repose or the absence of muscular exertion, all help to bring on sleep. To some it may seem strange that continuous noise acts like quiet. The truth is that the monotonous repetition of stimuli to the senses produces a level uniformity of impression which is practically for soporific purposes, equivalent to the absence of impression altogether. In this way the influence of a monotonous chant or lullaby, the "hush-a-bye baby" of the nursery, the murmur of the waves, the "sough" of wind through the branches of trees, and the dull roar of machinery in predisposing to sleep may be explained. Sameness of impression also acts in a manner which bears on the operation of another great predisposing cause of sleep—namely, freedom from mental oppressions or activity. It neutralizes the self-consciousness of the mind, by making it cease to think of its own operations. Dr. Carpenter, for example, points out that even when the mind is, by an act of will, directed to the contemplation or evolution of monotonous impressions the effect is the production of sleepiness. He cites as an example a well-known popular remedy amongst scholars for sleeplessness—namely, the automatic repetition of the tenses of a Greek verb. No doubt if a man is troubled by some exciting anxiety which would keep him awake, owing to the hurrying crowd of disturbing fears that it might engender in his mind, he will probably find it difficult, if not impossible, to bring on sleep. But if by an act of will he can transfer his attention to a dull monotonous train of harmless ideas—e. g., many sermons and most poems—he will, by a process of self-quietization, place himself under the operation of a predisposing cause of sleep.—*Science for All*.

MINING SCIENTIFIC PRESS

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The Week.

Among local events the great Musical Jubilee or May Festival has largely engrossed public attention the past week. The attendance at the Mechanics' Pavilion in this city, where the performance came off, has been large, not less than 10,000 people being present, the festival having proved both a pecuniary and a professional success.

The yield from the California gold mines continues without abatement, water being still in ample supply—the whole mining population exerting themselves diligently the while to make the most of it, so long as it lasts. The amount of gold produced by the hydraulic operators will this season be large beyond precedent. From the gulches and elevated diggings there will also be gathered more gold dust than has rewarded labor in these localities for many years past. As a whole the mining communities of California have been well prospered thus far the present season. With our other industrial classes also times are growing somewhat easier, the country demand having absorbed much of the excessive labor that had accumulated in the city. In the latter, too, there has been of late a little more call for work through a slight increase of building and some improvement in our local industries. There are yet, however, many unemployed or poorly paid people in the city, being those not fitted for the performance of harvest work or other severe out-door labor. Decoration Day was observed in this city by a general suspension of business and the performance of appropriate ceremonies. The weather the past week has been much of the time cold and lowering, but generally favorable to the maturing and gathering of the crops, as well also as to the prosecution of mining and our other leading interests.

Mining—How it is Carried on.

Mining at best is a chequered business. There is at least one blank for every prize. And it has been so from the first. There were disappointment and failures while the placers of California were yet in a virgin state. Men packed their blankets out of the mines in '49, satisfied that they would no longer pay wages. The army of the "dead-broke" began to muster even that early. There were tramps in those days—luckless, spiritless, worthless wights—just as there are now. There were feeble, inefficient persons who could not, and vagabonds who would not work, mining having always been afflicted with its full share of the incompetents and drones. But not in these has it found its greatest drawbacks. Paradoxical as it may seem, it has suffered most from men of opposite tendencies—from the slashing, go-ahead fellows—who, visionary, careless and wasteful have so often defeated their own endeavors, and dissipated what the more prudent and frugal had gained. And to this day we have found no sufficient corrective for this evil. After all we have suffered and lost we will not go about mining as we do about every other kind of business.

If a man having too little money would start a bog ranch, he finds another who has some funds, and forming a partnership they two carry on the porcine establishment with as little noise as circumstances will permit. The same when two or three men conclude to embark in lumber-making, they associate themselves together, put up a saw-mill, and run it as quietly as possible. And so of the whole round of industries till we come to mining, which has to be conducted in a way altogether different. For carrying on this, however small the enterprise, a company, with a Board of Directors and a Secretary, must be incorporated. An office must be hired and furnished. A set of books must be provided; always one for recording assessments and another for containing the blank certificates of shares, which certificates are usually embellished with some significant device, as a miner delving with a pick, to show that the hard work of the concern is to be mostly done on paper, or, a goddess of liberty, symbolical of the freedom with which the directors shall be permitted to embezzle the corporate funds. What use is made of this machine in a majority of cases is well enough known. Where one of these incorporated companies has ever achieved a marked and permanent success, a hundred have yielded up the ghost after a short and unprofitable career or survived only to filch money from the pockets of the shareholders. Of the losses incurred through stock gambling, nothing in this connection need be said.

In regard to the latter, it is certainly time it were purged of its more palpable and long-standing abuses. Rightly pursued, mining for the precious metals on this coast ought to be the safest and best paying industry in which our people could engage. Our mineral territory is rich in this class of deposits and of almost illimitable extent. The mines are open to all. They have not been and never can be monopolized to an injurious extent. The natural facilities for prosecuting the business are generally good. It is a healthful, manly occupation, incapable of being overdone or excessively crowded. For its products there is always a cash market. It never suffers from competition. Where rightly undertaken and prudently carried on, it is attended with as little uncertainty as most other callings. With so many advantages in its favor, it ought to have been far more successful than it has been. What makes failure here the more inexcusable is the fact that they might and should have been avoided.

The first thing to be done in correcting past mistakes is the observance of greater economy both at the outset and in current expenses. The substitution of limited partnerships or mere associations might in many cases be substituted for incorporated companies. For the management of every enterprise a man of practical experience should be selected; the practice of appointing persons to these positions merely out of considerations of friendship or to oblige some member of a company, being a very bad one. The plan of letting out work by contract, where practicable, has generally been found to work well. Companies or parties owning properties that are likely to prove lasting should erect comfortable dwellings for their workmen, as by this means they will draw into their service men of families, who, besides being more permanent and reliable, are more apt to take an interest in the business of their employers. This, too, by reducing the cost of living to the laborer, enables him to work for less wages, being at the same time more comfortable and independent. In some parts of California where mine proprietors have pursued this policy pleasant hamlets with a large youthful and a contented adult population have grown up about their works. After a time the workmen are apt to buy these dwellings with the ground about them, and feeling settled, begin to plant their places with trees, cultivate gardens and finally make for themselves handsome homessteads.

As to our boys, let them be turned out into the mines and there set to work earning a livelihood. It may be a little rough on them at first, but once they get used to it they will come to like the business.

The San Elizario Murders.

The persistence and earnestness with which the press of New Mexico and Western Texas continues to comment on the San Elizario massacre, evinces how deep is the public feeling in those sections of country in regard to that matter. This butchery took place now some five months ago, and yet the people and the press off that way seem as much alive to the subject as if it were an event of recent occurrence. That these cruel murders should have aroused general indignation at first is not at all strange, but that this feeling, instead of abating, should, with the lapse of time, have grown more intense, denotes how deep a hold it has taken on the popular heart and how very likely it will be to eventuate in serious trouble unless proper measures be taken to allay it. Indeed, there is little doubt the American residents, supported by the better class of native-born Mexicans, would long ago have proceeded to avenge this most atrocious crime, had not the public authorities, taking it upon themselves, promised to visit the guilty parties with condign and speedy punishment.

In pursuance of such purpose, a commission of three was appointed by the President and the Governor of Texas to investigate and report upon this horror. What may have been the exact finding of these commissioners, if any report has been made by them, has not publicly transpired. With the delay and uncertainty attending their action, the citizens of El Paso have grown restive, the whole look of the business seeming to them not at all reassuring; hence, this growing discontent and a revival of the excitement, that the hope of vigorous measures on the part of the commission had for a time partially abated.

If now the government expects, through the adoption of a non-committal and temporizing policy, to repress this excitement, or, through mere promises, to appease these well-founded demands for justice, it is preparing the way for a disappointment. These bordermen do not like to dispose of injuries of this kind in that way. To an open and manly foe they are apt to be forgiving and generous; to the cruel and cowardly, exacting and implacable. "Remember the Alamo"—how wildly that war slogan fired the Texan heart! In her struggle for independence, it was worth to the "Lone Star" State more than 10,000 armed men. It will be a sad day for the banded assassins on either side of the border, if ever the avengers of this most recent and most dastardly of all these frontier murders, shall raise the cry of "Remember San Elizario." If once breathed it will be the death note of many of them. If these treacherous assassins or the authorities, American or Mexican, flatter themselves that crimes of this kind can be committed without provoking retaliation or notice, they will in good time be disabused of this notion. The best way and the cheapest in the end is to thoroughly and impartially investigate these offenses and bring the guilty promptly to justice. Unless redressed in a public way, these will come to be considered private grievances, causing individuals to be forever seeking for retribution.

The circumstances attending this massacre were of the most aggravated kind, being briefly as follows: Judge Howard, an American citizen, a resident of San Elizario in El Paso county, Texas, having taken up certain salt marshes that had before been open to the use of the Mexican population in the vicinity, these people determined upon taking his life, to which end they collected at the above town in December last to the number of several hundred, coming from both sides of the Rio Grande, and commenced an attack upon Howard and his friends, who sought shelter in an adobe building, which they barricaded and thus kept their assailants at bay. On a promise from the mob, solemnized by the sacred oaths of their leaders, that their lives should be spared, the besieged consented to a surrender. No sooner had they done this, however, than three of their number, Judge Howard, John G. Atkinson and a man named McBride, were seized by the cowardly and treacherous miscreants, and shot in cold blood. This accomplished, the crowd proceeded to plunder the houses and stores of the murdered men, despoiling them even to the clothes they wore. Atkinson, before the shooting took place, had given up to the fiends the sum of \$11,000 that he had about him, on condition that they would release him and his companions. Charles E. Ellis, an old resident in the place, was lassoed, after which his throat was cut and the body thrown into a well, simply because he sought by kindly words to divert the murderers from their purpose before the bloody work commenced.

These men so ruthlessly butchered were all honorable, law-abiding American citizens, their good character being amply vouched for by the people among whom they lived. Concerning one of the victims of this enormity, John G. Atkinson, the writer can say of personal knowledge that he was a young man of fine character and very superior parts. We have been conversant with his history from childhood up, and can honestly say it was without spot or blemish. We might search among 10,000 of our California youth and hardly find one so exemplary in all the walks and relations of life as he. Brave, truthful and industrious, he educated himself by his own efforts and won the confidence and esteem of all who knew him. What at the outbreak of the late civil strife

the county called for soldiers, he was among the first to respond, having served long and well and received honorable wounds in the cause of the Union. As a partial reward for this service he was appointed to several positions of trust under the Government, in the discharge of which he was carried to that remote section of the republic, where he was basely and cruelly robbed of his life. Let the Government see to it that his murderers are punished and that proper reparation be made for the property of which he was despoiled.

Prof. Joseph Henry.

We have already mentioned the death of Prof. Henry, for years Secretary of the Smithsonian Institution. Prof. Henry was born in Albany, N. Y., in 1797. He was educated in that city and became Professor of Mathematics at the Albany Academy, at which place he did much of the work which rendered the electric telegraph possible. From this position he was called by the Government at Washington to assume direction of the Smithsonian fund. This was a large sum of money left by James Smithson to Congress "for the advancement and diffusion of knowledge." Left as it was in such a way, there were many chances that it would be diverted from its original purpose or at least unwisely expended. To the broad-minded policy and the perfect integrity of character of Prof. Henry, science owes a great debt of gratitude. For no one who is familiar with the work that has been done by the Smithsonian Institution, in the way of encouraging original research and in diffusing scientific knowledge, can deny that he has accomplished the purpose of its liberal founder. We only hope that the Lick trusts may be as wisely administered.

In the capacity of Secretary Prof. Henry did much good work in getting into operation the Signal Service, also in investigating the best methods of making fog signals for our lighthouse service. His name appears almost constantly in the scientific publications of America for the last 50 years, and his pen will be greatly missed in the future. Personally, Prof. Henry was of fine physique. He had a commanding figure and a noble intellectual face. He has been well called the Nestor of American Science. In his own social circle he was a most interesting man. He lived his last years in Washington with his three charming daughters, and the intellectual atmosphere of his home formed an agreeable contrast to the prevailing tone of society there. He was witty and could tell a good story as well as enjoy one better than most men. Withal he was a man of most uncompromising integrity. He hated shams, whether scientific or otherwise.

Professional Courtesy.

As the industries of Germany are not to be represented at the Paris Exposition, the Society of German Engineers have invited each of our mining engineers as may visit the French capital to come on to Germany and make an inspection of the mines, iron works, factories and other industrial establishments of that country, provision having been made by the public officials and directors of these various industries for facilitating that object. In tendering this invitation to their professional brethren on this side, these Germans allude to the courtesies extended them at the Philadelphia Exhibition, in terms expressive of their appreciation of these friendly acts, and a desire to reciprocate the same. That some of our American engineers will afford them an opportunity to gratify this desire is not unlikely, as there ought to be a great deal in the mines and work shops of the "Fatherland" to attract the profession, aside from these hospitalities so kindly tendered. In the expectation that such will be the case, the Minister of Commerce has directed, that technical works and maps in the Library of the Royal Mining Academy at Berlin, be open for the inspection of American visitors.

The Society of Civil Engineers of France have taken similar action in regard to the members of the American Institute of Mining Engineers, opening to them their rooms in Paris with privilege of their library and a hall for conversation, study, general meetings, etc., all of which will doubtless be gladly availed of and duly appreciated by such members of the Institute as may visit the great exposition.

THE MUSICAL FESTIVAL.—The great May Festival took place this week and was a decided success, the attendance being large and the audience appreciative. The building is not well adapted to the purpose, being rather large and bar-like even for the immense orchestra and chorus, while the solo singers failed to fill it even with their utmost exertions. Aside from this, however, Manager Bugbee may congratulate himself on the success of the undertaking, which has been not only a matter of great interest to the music-loving public, but to the whole community. Large delegations from the interior have been present, and all seemed to thoroughly enjoy the entertainment. We hope something of the kind will be arranged every year, if for no other purpose than to encourage and foster a love of music among our young people.

Our Electrical Industry.

Its Application to Mining.

What a proud pleasure it would be to the pioneers of electrical science could they but see the applications almost innumerable of their brilliant discoveries. Such men as Franklin, Arago and Faraday spent years of their lives in the study of the then almost unknown force, electricity. Not a thought had they but the pursuit of truth for its own sake, and yet see the results practical, in the narrowest sense of the word, that have come from their labors. Let any one spend, as we did the other day, a morning in the workshop of the Electrical Construction and Maintenance Company, and then say whether or not the study of pure science is of any practical good to humanity.

In the short space of a newspaper article it is difficult to give an idea of what is being done in this direction by men skilled in all that art and science can do to chain this wonderful force and render it obedient to our will. It is really worth the while for any one engaged in almost any business or pursuit to see for himself what he can find here to help him in carrying out his work. It would astound many to see how much is being done. Here in San Francisco has quietly grown up an industry which keeps pace with the latest developments of the science. Let a man in the remotest part of the civilized world give birth to some new combination of forces, and here on the very outposts of civilization, like Minerva full armed from the train of Jove, his invention springs into life.

There is not an application to which electricity can be put but what this enterprising body of men are ready to carry into execution. They manufacture all the necessary batteries, Grove, Bunsen, Daniell, and construct batteries of all kinds. The various telegraphic apparatus, that of Morse, the various automatic arrangements, telephones, burglar alarms, American District boxes, etc., are manufactured and kept ready for use. Besides they take contracts for the construction and equipment of all kinds of telegraphic and telephone lines.

They have nearly finished a very beautiful piece of apparatus for the San Francisco Fire Alarm Department. It is for the purpose of repeating the signals when required. In such moments of excitement it is no uncommon thing for the operator to send out the wrong signal when it is done by hand. But here the apparatus, when once set, an operation in which it is almost impossible to make a mistake, works automatically until the whole alarm has been repeated with perfectly measured strokes four times.

They are also putting into the New City Hall a set of 63 electric clocks, all run by a very simple and beautiful arrangement by a single pendulum.

Their arrangements for plating gold, silver, copper and nickel seem very complete, and the work seems to be very well done. The company owes much of its success to the labors of the well-known electrical engineer, Mr. S. D. Field, and to the foreman of the works, Mr. Syler.

Some interesting applications of

Electricity in Mining

Suggest themselves as worth the consideration of our readers. The telephone is here almost invaluable. As it appears in its latest forms, it is not necessary to use any battery in connection with it, as there is a bell attachment, rung by magneto-electricity, which signals the hearer at a distance of 100 feet. This improvement renders it perfectly adapted to mining work, since it is the simplest and at the same time the most perfect method of communicating at a distance yet known. It is also well adapted to use on the long extent of ditching in connection with hydraulic claims. Several have been ordered; notably, on the North Bloomfield and the South Yuba. Another very simple and useful method of sending signals (from lines of ditching) is by means of the American District Telegraph Company's Box, which has already been described in the pages of the PRESS. There are 12 signals which can be sent by each box, and in addition each box records itself by number at the central office. Now, if it be agreed beforehand that the signals in any certain order he taken to mean, e. g.: 1. No water. 2. Break in ditch. 3. Watchman going east. 4. Watchman going west. 5. Slide. 6. Send help. 7. Heavy rain, etc. Such signals can be sent from stations upon a line 100 miles long, and, as each box locates itself, the point at which assistance is needed is known at once.

Another useful little apparatus is the "watchman's clock." This little arrangement runs by clockwork and is so arranged that the watchman carries with him his own monitor, which never sleeps, is not open to bribery, and records with perfect exactness his performance of his duty at the exact time or his failure to do so.

A very useful application of electricity is the electric light. This is useful in all engineering work which has to be carried on at night. For example, to hydraulic miners again who can work often only through part of the year, when water is abundant, it is of the greatest importance that the night work be as effectively done as in the day time. There is no way of effecting this so economically as by means of the electric light. The current of electricity can be generated by revolving the armatures of a

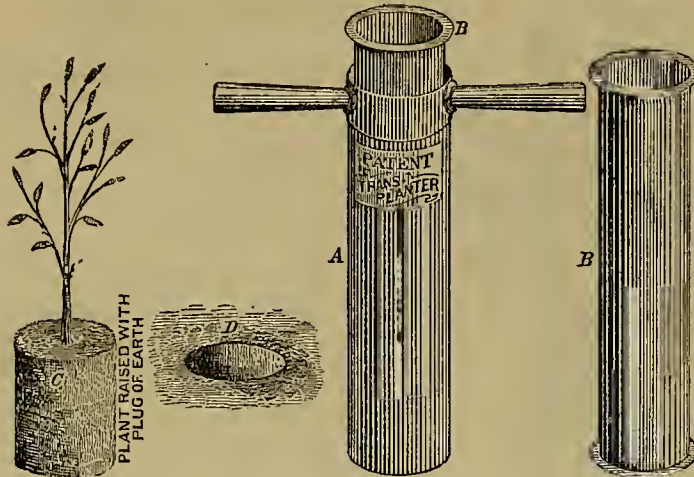
magnet, the intensity of current being regulated only by the strength of the magnet, and the speed of the revolution. In hydraulic claims this can be done by water-power, which of course is here abundant, and so that the electric light will, except for the first expense for the apparatus, cost simply nothing.

It has always struck us as curious that our miners, quick as they usually are to avail themselves of new ideas, have been so slow to take advantage of the wonderful facilities which are given them by this new agent. Perhaps it may have been from their ignorance as to whom to consult in this matter.

We think it time that some of these labor-saving devices were in still more general use upon this coast, while we are glad to see that there is enterprise enough among our practical mechanics and our capitalists as well, to take hold of a new science and reap from it such a harvest for their own benefit and that of the community.

Widney's Patent Transplanter.

Gardeners and tree-planters have heretofore been disappointed in the use of tools made expressly for transplanting plants and shrubs, and we should not be inclined to devote our time and space to the invention which forms the subject of this article if we were not, after



WIDNEY'S PATENT TRANSPLANTER.

well considering its merits, satisfied that it will prove a desirable article for persons who have many small trees or plants to transplant. One important reason for its success over all its predecessors lies in the fact that its work is better done than it can be accomplished by the most careful hand work. Plants transferred by its agency are more certain of life, and there is less interruption or interference in the course of their growth.

Although positively a labor-saving apparatus,



GEOGRAPHICAL LOCATION OF BODIE AND ESMERALDA DISTRICTS.

we consider a greater value rests in the superiority of its work. The invention is fully described by the patentee, R. M. Widney, of Los Angeles, as follows:

The Object to be Accomplished.

The object of the transplanter is to take up the plant with a solid plug of earth around the roots undisturbed, and resetting the same in a hole, around which hole the ground is undisturbed and ready to receive and nourish the young roots, thus leaving the plant in as near its natural growing condition as possible.

How it is Done.

The transplanter, A, is first used to cut a hole, D, in the ground or in a box of dirt, where you want to set the plant. Next the transplanter is set down over the plant so that the top of the plant runs up inside of the inside cylinder, B. The outer cylinder is then pressed down into the ground, giving it a slight rotary motion, until you have cut to the depth desired, generally two or four inches. (In pressing down on the handles, care must be taken to keep the hands off from the inside cylinder, which must be left loose so as to move freely.) The rotary motion gives a sharp drawing cut.

After cutting down around the plant to the depth desired, lift the transplanter out of the

ground. It will bring up the plant with a solid plug of earth, C, inside the cylinder. Now put the transplanter containing the plant into the hole in the ground (or box) first cut. Set it down to the bottom of the hole so that the bottom of the plug of earth rests on the bottom of the hole; place the two thumbs on top of the inside cylinder, retaining the hold on the handles with the fingers, and close the hand, thus drawing up the outside cylinder while the inside cylinder thus holds the plug of dirt in the hole. The plug of dirt is thus forced out of the transplanter as the wad is forced out of a pop-gun. When this is done, the plant with a solid plug of earth, C, will be left in a hole surrounded by unmoved dirt. Pour a trifle of water around the plant, which runs loose earth into the little crevices around the plug, and the work is completed. After a few experiments the work can be performed with great rapidity.

The object of the outside cylinder is to cut down into the ground and take up a plug of earth. The object of the inside cylinder is to force that plug out.

What the Transplanter has Done.

Mr. Widney has put his transplanter to careful tests to prove its efficiency, and has secured the aid of his neighbors in making trials of it. He writes as follows: "Some three years ago I commenced to set out some 200 acres of eucalyptus trees. I raised the plants and put them in boxes, 20x24, set-

Bodie and Esmeralda Districts.

We have received from Mr. Joseph Wasson, the author, a little pamphlet on "Bodie and Esmeralda," being an account of the revival of affairs in these two singularly interesting and important mining districts, including some of their past history, with a detailed description of mines most developed, tunnels, mills, etc. A resume is also given of the general resources of Mono and Esmeralda counties. A number of maps and illustrations are also given. Included in the contents is the gist of the reports of Profs. Benjamin Silliman and W. P. Blake, the late J. Ross Browne, B. H. Shaleh and H. R. Whitehill. The book may be had through this office. A retrospective and prospective glance is given, together with a detailed account of the mines and operations of the present time. Mr. Wasson has lately visited these districts, and his observations are fresh and interesting.

The accompanying map, which we take from the pamphlet referred to, will assist the reader in determining the relative positions of the districts. Bodie is in Mono county, Cal.; Esmeralda is in the county of that name in Nevada; the boundary line separating the two States passing about midway between the two districts. Distance from Carson (where travel is transferred from car to stage coach) to Bodie, via Aurora, 110 miles; fare \$15. From San Francisco to Bodie, \$36; time, 36 hours. From the junction five miles north of Aurora stages leave for Marietta (45 miles), Bellville, Columbus, Silver Peak and other places of interest in Esmeralda county, within a radius distant from Aurora of from 75 to 125 miles. Roads generally good, with corresponding accommodations.

As Mr. Wasson says, almost a generation has passed since these districts were a leading theme on 'change, and but a limited number of the California people of to-day retain anything more than a vague recollection of the "Esmeralda" excitement—some, of course, to their sorrow; but few can he found who will not readily admit that they themselves were more to blame than the mines in question. No two districts are at the same time so important and less rightly understood. The object of his publication is to present just sufficient of the leading outlines and details of the past and present history and affairs of two of the most interesting districts in the annals of mining, as to enable the reader, in one or two hour's time, to obtain a substantial and intelligent impression thereof.

The following remarks, made by Mr. Wasson in the introductory chapter, though general in character, will be recognized as true by mining men: The progress made in mining for the precious metals during the past 18 or 20 years (speaking of quartz or vein mining, of course) is so striking, that it recalls the remark of a favorite author, concerning the old Goths and Vandals—that they discussed every subject twice: once drunk, that their debate might not lack vigor, and once sober, that they might not want discretion. Speculating in mining stocks is quite a different matter from real mining, and, no doubt, the wildest excitements will be repeated over and over again; but it cannot be in the nature of things that the reckless disregard of all systematic exploration, so characteristic of vein mining in its earlier stages, will ever be repeated on this coast; such a wild use of means and general bad management, pure and simple. The raids of the barbarians, during the dark ages were no more bloodthirsty or heightened in character than the continual "rush" in quest of "new diggings," and the accompanying operations as to development. It was little better than a drunken orgie of rapacity, ignorance and extravagance. There being no longer new worlds to conquer, there is a comparative settling down to the best methods of realizing something from the discoveries already made. A successful soldier, having removed all barriers to prospecting, there is no longer any faith placed in the stories of the early emigrants on northern routes, or of the Jesuits of the southern borders; mining everywhere has become a question of money, muscle and intelligence. The occasional reports of rough life in the Black Hills, sound like the echoes of an almost forgotten past. Doubtless new discoveries will yet be made, but the day of wild adventure is over. The advantage of railroad extensions cannot be overestimated in connection with pushing the discovery of new districts, and their subsequent development. It enables prospectors, wherever there are no mills, to ship ores long distances for purposes of testing and for sale; the advantages of travel, transportation of supplies, etc., are of course self-evident. The invention of nitro-glycerine and its various ramifications have also taken place, and served to revolutionize mining. The substantial monopoly of mining interests on the Comstock, however, is compelling men of means and who are disposed to invest in such enterprises, to look elsewhere. Probably no more striking instance of this fact can be found outside of the two districts treated of in the following publication. Even that able and jealous guardian of Washoe interests—the *Enterprise*, of Virginia, Nev.—in an editorial of date February 10th, 1878, speaking of "Outside Camps," in a constrained manner, says: "There seems to be an impression that there is a drawing away from Comstock shares, and a disposition to search for outside mines. * * * Turning south, Aurora has awakened from the lethargy of years, and 10,000 eyes are turned toward that district and its neighboring district of Bodie."

The recent rain at San Bernardino was the heaviest of the season, one and three-eighths inches having fallen.

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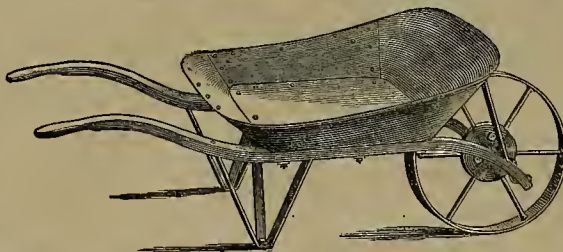
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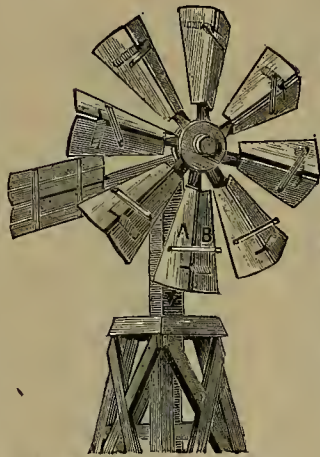
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ADAM WEBBER, PROPRIETOR.

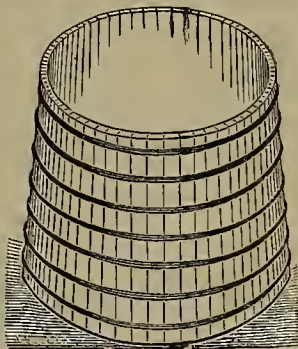
Office—No. 633 East 15th Street, New York.

CLAY GAS RETORTS, (Glazed and Unglazed,) GAS HOUSE TILES, FIRE BRICK, BLOCKS, ETC., FIRE CLAY AND SAND ALWAYS ON HAND.

ASSAY MUFFLES AND FURNACES.

CUPOLA BRICKS FOR MCKENZIE AND OTHER CUPOLAS.

(Refer to the San Francisco Gas Light Company and to the Pacific Rolling Mills.)



WATER TANKS of any capacity made entirely of machinery. Materials the best in use; construction excellent. Pan Staves, Tubs and Oak Guides for mining purposes a specialty.

WELLS, RUSSELL & CO.,
Mechanics' Mills, Cor. Mission and Fremont Streets

Dewey & Co. { Sansome St. } Patent Ag'ts.

R. HOE & CO'S CHISEL TOOTH MILL, SHOP,

And Edger Circular Saws with Recent Improvements,

Made especially to meet the requirements of the heavy work of this Coast, are now giving perfect satisfaction in the many mills in which they are in use.

A SIXTY DAYS' TRIAL,

Which we allow responsible parties, will convince them that they cannot too soon avail themselves of the advantages of a saw that is in perfect condition to run when they receive it, and always remains sharp, exactly round, and precisely the same to a hair in every respect, without any of the expensive skilled labor which other saws constantly demand. Both Filers and Files are dispensed with.

The teeth being always the same length, and the cutting angle always the same, they never dodge, but go through the knots in a surprising manner.

They never have to be taken off the mandrel, and will stand up square in edging any stock, which makes them indispensable for gangs.

The advantages being too numerous to mention in an advertisement, parties will please send for circulars and say they saw this in Mining and Scientific Press.

H. L. TATUM & Co., Sole Agents,

No. 51 Fremont Street, San Francisco

Also, agents for the ALBANY LUBRICATING COMPOUND AND CUPS, the only reliable method of lubricating machinery, doing it almost without attention, absolutely without drip or slop, and at a merely nominal expense, and for the WORLD STANDARD CYLINDER OIL, OF SAME MAKE.

West Berkeley Lumber Yard, ALAMEDA COUNTY.

(Successors to Z. B. Heywood & Co.)

Lumber, Shingles, Sash, Doors, Lime, Brick, and Builders' Hardware

Sold at the Lowest San Francisco rates. Strict attention given Country Orders. Boats loaded at wharf for all points on the San Joaquin and Sacramento rivers. Cars of the C. P. R. R. Co. loaded at the yard. Orders received at 22 California Street, San Francisco, or at the hardware store of G. W. Babcock, 955 Broadway, Oakland.

JOHN F. BYXBEE, Proprietor.

THOMAS RICHARDSON, Manager.

Copp's Hand-Book of Mining Laws.

Henry N. Copp's hand-book of mining laws, just issued, contains the United States mining laws and instructions thereunder, a digest of decisions, forms, list of mining patents issued, etc. The digest of decisions alone is a very valuable thing, giving, as it does, in brief form, all the decisions of the Secretary of the Interior and Commissioner of the General Land Office in relation to mining matters. These are all under proper headings for easy reference. Forms are given for notice of location, proof of labor, notice of forfeiture, miners' lien, application for survey, patent, etc., affidavit of improvements, etc. There is also a list of patents issued for mining claims from July 26th, 1865, to August 1st, 1877. The book is of pocket size and very convenient for all who are interested in mines. It will be sent post-paid for \$1, on application to Dewey & Co., 202 Sansome street, San Francisco.

San Francisco Pioneer Screen Works,

J. W. QUICK, MANUFACTURER,

Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

32 Fremont Street, San Francisco.

Diamond Drill Co.

The undersigned, owners of LESCHOT'S PATENT for DIAMOND POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING AND TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

A. J. SEVERANCE & CO.

Office, No. 320 Sansome street, Room 10.

PARTNER WANTED.

Partner wanted for the country (increase of business the cause,) in an established Foundry and Machine Shop. Must be a good practical draftsman, pattern maker or finisher, first preferred. References required. For particulars address

BENJ. HEALEY, 402 Montgomery St., S. F.

THESE LARGE, FINE, NEW DINING Rooms are exceedingly popular. The best of everything on the tables.
RESTAURANT, Dinner furnished at the low price of
NO. 218 SANSOME ST., S. F. FIFTY
CENTS, from five to eight p. m. Visitors to S. F. should try the Palace.

ICE! ICE!! ICE!!!

Ice at \$1.00 Per Ton.

PICTET ARTIFICIAL ICE

COMPANY. (Limited).

Room 51, Coal and Iron Exchange.

P. O. Box 3083, New York.

PACIFIC RURAL PRESS.

A first-class 16-page Illustrated Agricultural Weekly, filled with fresh, valuable and interesting reading. Every farmer and ruralist should take it. It is immensely popular. Send for a sample copy.

DEWEY & CO., Publishers, S. F.

Machinery.

The Ingersoll Rock Drill



Mines Using these Drills on the Comstock Lode—Virginia City, Nevada:

Con. Virginia M. Co., Best & Belcher M. Co.,
California M. Co., Crown Point M. Co.,
C & C Shaft, Belcher M. Co.,
Utah M. Co., Yellow Jacket M. Co.,
Ophir M. Co., Sierra Nevada M. Co.,
Mexican M. Co., Prospect M. Co.,
Overman M. Co., Baltimore Con. M. Co.,
Hillman M. Co., Silver Hill M. Co.,
Con. Imperial M. Co., Dayton M. Co.,
Gould & Curry M. Co., Sutro Tunnel Co.

J. B. REYNOLDS.

327 Market Street.

THE O'HARRA
CHLORIDIZING FURNACE.

This furnace is guaranteed to chloridize from 88 per cent. to 95 per cent. of the silver, and put gold in a state so that 88 to 95 per cent. of the battery assay can be obtained by amalgamation on any gold or silver ore ever formed by nature.

The cost of Roasting and Chloridizing is as follows:
One man, per day.....\$ 3 50
One man, per day.....\$ 3 00
Wood, 17 cords at \$3.....7 00

Cost of 20 tons.....\$13 50
Cost of one ton.....67 1/2
From 2 1/2 to 5 per cent. of salt is necessary.
In a furnace of three or four times this capacity the cost is decreased by 20 per cent.

Several furnaces are in successful operation in California, Nevada and Idaho.

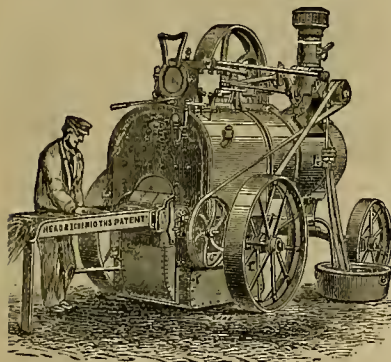
Any persons wishing any reference can address:
JUDOK W. WENSTER, Paymaster Mine, Reno, Nev.
LEWIS CHALMERS, Manager Enchequer and IXL Mines,
Silver Mountain, Cal.
J. S. CONE, Vice-President Tehama County Bank, Red Bluff, Cal.

R. H. CAMPBELL, Superintendent Afterthought Mine, Redding, Shasta County, Cal.

For further information, apply to

D. J. O'HARRA, Reno, Nevada.

STEAM ENGINES AND BOILERS.



One new Straw-burning Portable Engine, made by Ransouo, Sims & Head, Ipswich, England. This is a very superior engine, sent here as a sample engine for exhibition; one second-hand Straw-burning Engine, 8x10 inch cylinder, (Rice); one second-hand Wood-burning Engine, 8x12 inch cylinder, (Hoadley); one second-hand Wood-burning Engine, 7x10 inch cylinder, (Hoadley); one second-hand Wood-burning Engine, 5 1/2 x 10 inch cylinder, (Hoadley); one second-hand Wood-burning Engine, 6x12 inch cylinder, side engine; one new Stationary Engine, independent cut-off, 12x24 inch cylinder. (The Straw-burning Engines named are free from infringements.)

One large sized Rock Breaker, Varney & Rix, size 8x15; one Wood Splitting Machine; one 36-inch cylinder Russell Separator, (with extra cylinder), and Lauffenberg shoe very cheap, on account of owner's death; (will be sold with or without any of above engines.) All of the above second-hand engines have been in shop and overhauled, and are in good working order. Various other machinery for sale. Purchase made on Commission. Machinery repairs solicited. Specialty of Portable Engines and Boilers for threshing.

J. W. RILEY, (Box 2361) San Francisco.

BONE MILLS.

THE BEST IN THE WORLD.

FIVE SIZES.

Perfectly adapted for Crushing and Grinding Minerals and all hard substances. Grinding surfaces quickly and cheaply renewed.

Send for descriptive pamphlet.

BAUGH & SONS, Philadelphia.

\$1,000 Challenge Ore Feeder.



HENDY'S \$1,000 CHALLENGE ORE FEEDER.

I call my Automatic Ore Feeder the \$1,000 Challenge, because I challenge the owners or backers of any other feeder to a competitive test for that amount. As Mr. C. O. Rodgers, Superintendent of the Green Mountain mine, near Greenville, Plumas county, appears prominently as a detractor of the merits of my feeder, and seems confident that another one is better, perhaps he will accept this long-standing challenge which the owners of other patents will not, and give me an opportunity to prove publicly the superiority of my machine. As to Mr. Rodgers' assertion about my feeder wearing out, it is no less fallible in that respect than other machinery; but I have over 250 now in use, some of them for over two years, and have never had to expend 25 cents for repairs. The fact that my feeder received the premium at the late Mechanics' fair, and that I am shipping several feeders weekly to different parts of the country, is sufficient proof of the appreciation in which it is held.

As to my feeders having been thrown out of the Gold Stripo mill, they were not displaced for inefficiency, as the following letter will show, and it answers also as a complete refutation of Mr. Rodgers' statement:

OFFICE SUPERINTENDENT OF THE GOLD STRIPE G. M. CO., GREENVILLE, PLUMAS CO., OCT. 16TH, 1877.

JOSHUA HENDY, Esq.—Dear Sir:—Your favor of the 15th instant at hand. In reply to your inquiry as to the working of your ore feeders at our mill, we can say that there is no fault in the machines, and we consider them the best now in use. At present they are not in use with us, owing to the construction of the mill, which we are about to rebuild and make proper arrangements for putting in your feeders.

J. K. OWEN, Superintendent Gold Stripo Mine.

One of the principal owners of the Gold Stripo and Green Mountain mills is also largely interested in the Plumas National mine, where I have just shipped several feeders, showing the confidence placed in the machine by these gentlemen who have used it.

Now, if Mr. Rodgers is sincere in his belief as to the merits of a rival machine over mine, here is a chance for him to make a thousand dollars easily, if he can get the owners of the machine to lend him one for the trial, which is the only doubtful thing in connection with the matter. Mr. Rodgers' eight months' experience with both machine ought to give him confidence enough in his own convictions to accept the challenge offered to him, or any one else.

JOSHUA HENDY.

Corner Fremont and Market Streets, San Francisco.

It may be considered as now fully demonstrated, by careful and long-continued experimentation, that the plan upon which a perfect ore feeder must be constructed is that of the carrier, and not that of the shaking table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Spasmodic or jerky contrivances will not answer the purpose.

We warrant the machines to give perfect satisfaction, and to be a better and more durable Feeder than any other the market, and will sell them as cheap as any other of its class.

ENDORSED BY THE FOLLOWING PARTIES:

Gr an & Brewster, 312 Montgomery St., San Francisco, Cal.
O. F. Verdalen, 400 California Street, San Francisco, Cal.
J. F. Lightner, Room 53, Nevada Block, S. F. Cal.
O. H. Bogart, 402 Montgomery St., San Francisco, Cal.
Bardwell, Walter & Co., 408 California St., S. F., Cal.
Haggin & Tevis, 50 Nevada Block, San Francisco, Cal.
Eclipse Mill, Independence, Inyo County, Cal.
Silver King Mining Company, Arizona.
Gold Stripo Mining Company, Plumas County, Cal.
Crescent Mine, Plumas County, Cal.
Hidden Treasure, Deadwood, Black Hills.
S. B. Schrontz, Del Norte, Colorado.
Little Anna Mine, Colorado.
Briggs Bro., Block Hanker, Colorado.

Ontario Mills, Parley Park, Utah.
Julian Mill, Newcastle, Placer County, Cal.
St. Patrick Mining Company, New Castle, Placer Co., Cal.
Bunker Hill Mill, Amador County, Cal.
Gover Mining Company, Amador County, Cal.
Talisman Mining Company, Amador County, Cal.
O. C. Hewitt, Keystone G. M. Co., Amador City, Cal.
Boston Mill, Gold Hill, Nevada.
Soudby Mill, Tuolumne County, Cal.
California Company, Nevada County, Cal.
Omaha Gold Mining Company, Grass Valley, Cal.
Star Mine, Sonoma, Tuolumne County, Cal.
C. J. Garland Mine, Mosquito Gulch, Calaveras Co., Cal.
S. D. B. Stewart, Lincoln G. M. Co., Sutter Creek, Cal.

For Description, Send for Circular to

JOSHUA HENDY, SOLE MANUFACTURER. Cor. Fremont & Mission Sts., S. F., Cal.,

WHERE IT CAN BE SEEN IN OPERATION. Also, Manufacturer of

HENDY'S IMPROVED AMALGAMATOR and CONCENTRATOR,
And COCHRANE'S IMPROVED CAM.

AND DEALER IN QUARTZ MILL MACHINERY.

GRAND HEADQUARTERS FOR MUSICAL BOXES.

M. J. PAILLARD & CO.,

Manufacturers and Importers of all kinds of

MUSICAL BOXES

—FOR—

Holiday, Birthday

—AND—

Wedding Presents,



OF STANDARD REPUTATION.

Our stock embraces the latest novelties, the newest and most pleasing airs, and the most approved appliances for rendering them with every shade of musical expression.

227 We offer this season many new improvements that must be seen to be appreciated, therefore buyers coming to San Francisco are invited to examine our stock—THE LARGEST IN THE CITY.

228 Medal and diploma awarded at the Centennial Exposition to our establishment in Switzerland for excellence in manufacture, durability, volume, purity of sound and superior workmanship. Also, medal awarded at the Mechanics' Institute Industrial Exhibition, San Francisco.

REPAIR DEPARTMENT.—Our workmen are especially educated to all kinds of intricate repairs, so that all repairs entrusted to us will meet with careful, skillful and prompt attention. We are recipients of many special patents for improvements in musical boxes.

M. J. PAILLARD & CO., No. 120 Sutter St., (Rooms 5 and 6) San Francisco.

680 Broadway, New York, and St. Croix, Switzerland.

MUSICAL BOXES

—FOR—

Holiday, Birthday

—AND—

Wedding Presents,

FIRE! FIRE!! FIRE!!!

ENGINE FOR SALE.

A first-class, large sized Britton Fire Engine, in fair order is offered for sale cheap. Price, \$400. It is worth more than double that sum. About forty men can work on the brakes. Towns or corporations wishing a good machine should examine this engine before ordering elsewhere. Apply to

ROOT, NELSON & CO.,
Union Foundry, Sacramento

Established 1844.

JOSEPH C. TODD,
(Formerly of TODD & RAFFERTY.)

ENGINEER

—AND—

MACHINIST.

Flax, Hemp, Jute, Rope, Oakum and Bagging Machinery, Steam Engines, Boilers, etc. I also manufacture Baxter's New Portable Engine of 1877, of one horse-power, complete for \$125; can be seen in operation at my store. I will furnish specifications and estimates for all kinds of machinery. Send for descriptive circular and price.

Address J. C. TODD,

10 Barclay Street, N. Y., or Paterson, N. J.

PACIFIC MACHINERY DEPOT.

H. P. GREGORY & CO

Cor. California & Market Streets, S. F., Cal

Importers of and Dealers in

MACHINERY of all Descriptions.

SOLE AGENTS FOR PACIFIC COAST FOR

J. A. Fay & Co.'s Woodworking Machinery, Bement & Sons' Machinists' Tools, Blake's Patent Steam Pumps, N. Y. Belting & Packing Co.'s Ruhher Goods Sturtevant Blowers and Exhaust Fans, Tanite Co.'s Emery Wheels and Machinery, Payne's Vertical Engines and Boilers, Judeon's Standard Governors, Dreyfus' Self Oilers, Gould Manufacturing Co.'s Hand Pumps, Platt's Patent Fuse Lighters, Lovejoy's Planer Knives.

A FULL LINE OF

Belting, Packing, Hose, and Other Mill and Mining Supplies on Hand.

227 Send for Illustrated Catalogue

EMILE BOESCH,
(Patentee and Manufacturer.)
569 MISSION STREET, below Second, S. F.



Patent Mining & Locomotive Head-Light.

Medal Awarded at 12th Industrial Exhibition of 1877 at S. F. Hall and Show Window Reflectors of Corrugated Tin and Silvered Corrugated Glass, Sectional, Globe and any Style of Ornamental Lamps for Hotels, Private Residences, Churches, etc. Ship, Railroad, Street Car, Coach, etc.

SPINNING OF SHEET METAL TO ORDER.
Send for further information.

Smelter and Refiner.

A competent person is desirous of receiving the position of Superintendent of a Smelting and Refining Works. Can give satisfactory reference for ability to smelt all lead ores, refine silver and make market lead. No objections to go to the Territories. Address P. F. M., this office.

JOHN L. BOONE,

Attorney and Counsellor at Law,
PATENT LAW A SPECIALTY.

Office—320 Sansome Street, Halleck's Block, San Francisco.

The gravel mines of Moore's Flat, Nevada county, are working a large number of men and making fine returns. There are no idle men in that section of the country. It is supposed that recent discoveries in the various drifts and shafts will introduce a new era in Nevada gravel mining. — *Grass Valley Union.*

85	Occidental	100%	1
220	Savage	100%	1
160	Sierra Nevada	4.20@1.5	1
100	Traver Hill	2.40@1.5	1
100	Union	1.80@1.5	1
160	Union	1.80@1.40	1
190	Wells Fargo	30@13C	1
35	Yellow Jacket	81@48C	1
100	Boyle	50C	1
160	Bullion	4.05@4.4	1
30	Best & Belcher	151@123	1
220	Best & Belcher	2.80@2.6	1
225	California	2.80@2.6	1
225	California	2.80@2.6	1
300	Cal. Virginia	133	1
300	California	1.90	1
225	California	2.80@2.6	1
150	Exampler	3.70@2.65	1

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

By Special Dispatch from Washington, D. C.

WEEK ENDING, MAY 14TH.

CONSTRUCTION OF HULLS OF STEAM VESSELS.—Robert Charles Brown, Portland, Oregon.
FIRE ESCAPES.—Francis C. Bryant, Seattle, Washington Territory.
EARTH AUGERS.—Benjamin F. Mull, Merced, Cal.
WASHING MACHINES.—Truman Austin, Virginia City, Nev.
ADJUSTABLE TRACE FASTENINGS.—Adam Ruthford, Walla Walla, Washington Territory.

TRADE-MARKS.

CRACK TARTAR.—J. Saxon Taylor, S. F.

LABELS.

"EDWARD'S SUPERIOR LAUNDRY BLUING."—The Western Manufacturing Co., S. F.

GENERAL MERCHANDISE.

(WHOLESALE.)

WEDNESDAY M., May 23, 1878.

BAGS—Jobbing.
Eng Standard Wheat, 114 @ 111
Neville & Co's
Hand Sewed, 22 3/4 @ 111
24 3/4 @ 111
Machine Swd, 22 3/4 @ 111
24 3/4 @ 111
Flour Sacks, halves, 8 1/2 @ 10
Quarters, 5 1/2 @ 10
Hessian, 60 inch, 15 @ 10
45 inch, 15 @ 10
40 inch, 15 @ 10
Wool Sacks, 3 1/2 @ 10
Hand Sewed, 3 1/2 @ 10
Machine Swd, 3 1/2 @ 10
Standard Gunnies, 14 @ 10
Bean Bags, 17 @ 8
CANNED GOODS.
Assorted Pie Fruits, 2 1/2 @ 30
2 1/2 @ 30
Table do, 3 1/2 @ 25
Jams and Jellies, 4 @ 25
Pickles, 1/2 gal, 3 @ 50
Sardines, 1/2 box, 1 @ 10
H. Boxes, 3 @ 50
Preserved Beef, 4 @ 10
do Beef, 4 1/2 @ 50
Preserved Mutton, 4 @ 10
do Beef, 4 @ 10
Beef Tongue, 5 @ 50
Preserved Ham, 5 @ 50
do Ham, 4 1/2 @ 50
do Ham, 4 1/2 @ 50
COAL—Jobbing.
Australian, ton, 7 @ 7 25
Coke Bay, 5 @ 7 00
Bellingham Bay, 5 @ 7 00
Seattle, 5 @ 7 00
Cumberland, 14 @ 6 50
Mt Diablo, 4 75 @ 6 50
Lehigh, 22 @ 6 00
Liverpool, 7 @ 6 00
West Hartley, 7 50 @ 6 00
Scott, 5 50 @ 6 00
Scribner, 13 @ 6 00
Vancouver Id., 7 50 @ 6 00
Common sack, 75 @ 6 00
Coke, hbl, 60 @ 6 00
COFFEE.
Sandwich Id, lb, 21 @ 20
Costa Rica, 18 @ 18
Guatemala, 18 @ 18
Java, 23 @ 25
Manila, 18 @ 18
Ground, in c, 25 @ 25
FISH.
Sago Dry Cod, 5 @ 51
do la cases, 51 @ 7
Eastern Cod, 8 @ 81
Salmon, hbls, 9 @ 10
do hbls, 5 @ 10
2 lb cans, 310 @ 20
Pild Cod, hbls, 22 @ 20
Hf hbls, 11 @ 20
Mackerel, No. 1, 11 @ 20
Hf Hbls, 23 @ 20
In Kits, 23 @ 20
Er Mess, 3 50 @ 4 50
Pild Herring, 13 @ 3 50
Boston Smoked, 4 @ 50
LIME.
Lime, Sta Cruz, hbl, 2 @ 2 25
Cement, Rosen, 2 75 @ 3 50
Portland, 4 75 @ 5 50

LEATHER.

(WHOLESALE.)

WEDNESDAY M., May 23, 1878.

Sole Leather, heavy, lb, 22 @ 24
Light, 20 @ 24
Jodot, 8 Kil, doz, 48 @ 50
14 to 15 Kil, 65 @ 75
14 to 15 Kil, 80 @ 80
Cannellian, 12 to 15 Kil, 50 @ 60
Female, 12 to 15 Kil, 50 @ 60
14 to 15 Kil, 70 @ 75
Simon Ulmo, Female, 12 to 15 Kil, 50 @ 60
14 to 15 Kil, 50 @ 60
18 to 17 Kil, 72 @ 74
Simon, 18 Kil, 50 @ 60
20 Kil, 50 @ 60
24 Kil, 72 @ 74
Robert Chalf, 7 and 9 Kil, 1 @ 1 35
Kips, French, lb, 1 @ 1 35
Cal, doz, 40 @ 60
French Sheep, all colors, 8 @ 15
Eastern Calf for Back, lb, 1 @ 1 25
Sheep Roans for Topping, all colors, doz, 5 @ 10
For Linings, 5 @ 10
Cal. Russet Sheep Linings, 175 @ 4 50
Boat Legs, French Calf, pair, 4 @ 4
Good French Calf, 4 @ 4
Beat Jodot Calf, lb, 35 @ 38
Leather, Harness, lb, 35 @ 38
Fair Bridle, doz, 43 @ 70
Selling, lb, 33 @ 37
Well, doz, 30 @ 60
Buff, lb, 18 @ 20
Wax Side, 17 @ 18

METALS.

(WHOLESALE.)

WEDNESDAY, M., May 23, 1878.

IRON.
American Pig, ton, 28 00 @ 30 00
Scotch Pig, ton, 28 00 @ 30 00
White Pig, ton, 28 00 @ 30 00
Oregon Pig, ton, 28 00 @ 30 00
Reinforced Bar, 21 @ 31
Horse Shoes, keg, 5 00 @ 5 00
Nail Rod, 1 @ 7 1/2
Norway, Orval, 1 @ 7 1/2
COPPER.
Sheathing, lb, 34 @ 35
Sheathing, Yellow, 21 @ 21
Sheathing, Old Yellow, 12 @ 12
Composition Nails, 24 @ 24
Composition Bolts, 24 @ 24
STEEL.
English Cast, lb, 13 @ 14
Anderson & Woods, ordinary sizes, 15 @ 15
Flat Bar, 15 @ 19
Pilot Steel, 84 @ 121
TIN PLATES.
10x14 C Charcoal, 7 50 @ 8 50
Banca Tin, 23 @ 24
Australian, 17 @ 17 1/2
ZINC.
By the Case, 9 @ 9
25x3 Sheet, 13 ft, 7 to 10 lb, 10 @ 10
7 1/2 ft, 11 to 14, 11 @ 11
8 1/2 ft, 8 to 10, 11 @ 11
8 1/2 ft, 11 to 10, 11 @ 11
QUICKSILVER.
By the lb, 43 @ 45

Gold, Legal Tenders, Exchange, Etc.

(Corrected Weekly by SUTRO & Co.)

SAN FRANCISCO, May 23, 3 P. M.

LEGAL TENDERS IN S. F., 11 A. M., 99 @ 57. SILVER, 21 @ 23
Gold in New York, 100.
Gold Bars, 99 @ 100. SILVER Bars, 9 @ 15 @ cent. dis.
count.
EXCHANGE ON NEW YORK, 1 1/2; on London bankers, 9 @ 49.
Commercial, 50; Paris, five francs 9 dollar; Mexican
dollars, 94.
LONDON Consols 95 11-15; Bonds, 105 1/2.
QUICKSILVER IN S. F., by the flask, 46 @ 47 1/2.

Signal Service Meteorological Report.

Week Ending May 28, 1878.

HIGHEST AND LOWEST BAROMETER.
May 22 May 23 May 24 May 25 May 26 May 27 May 28
30.11 30.14 30.08 30.00 29.98 29.82 29.99
30.03 30.02 29.93 29.84 29.85 29.73 29.82
MINIMUM AND MAXIMUM THERMOMETER.
62 | 64 | 78 | 68 | 65 | 67 | 67
54 | 52 | 61.5 | 55 | 53 | 54 | 50
MEAN DAILY HUMIDITY.
72 | 82 | 67 | 80 | 71 | 50 | 67
PREVAILING WIND.
SW | W | W | SW | SW | W | SW
WIND—MILES TRAVELLED.
184 | 241 | 226 | 230 | 301 | 225 | 376
STATE OF WEATHER.
Clear. | Fair. | Clear. | Fair. | Clear. | Clear. | Clear.
RAINFALL IN TWENTY-FOUR HOURS.
Total rain during the season, from July 1, 1877, 35.15 in.

Woodward's Gardens were never more attractive than at present. A fine lion and two lionesses, all young and not fully grown, have just been added. Balloon ascensions by Prof. Martin are now being made. The popularity of the gardens continues to increase. Rates of admission unchanged.

OUR AGENTS.

Our FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. L. THAYER—San Francisco.
B. W. CROWLEY—California.
A. C. KNOTT—Pacific Coast.
C. N. WEST—Santa Cruz, Monterey and San Benito counties.
A. C. CHAMPION—Tulare, Fresno and Inyo counties.
EDWARD S. BAKER—Australian Colonies and Sandwich Islands.
W. D. WHITE—San Bernardino and Los Angeles counties.
J. W. A. WRIGHT—Sacramento county.
B. E. LLOYD—Sonoma and Napa counties.
E. M. DENRY, Oregon.
H. E. HALLER—Marin county.
G. W. MCGREW—Santa Clara county.
W. M. BREWER—Black Hills, Dakota Territory.
RICHARD ALLEN—British Columbia.
R. D. NUNNALLY—Siskiyou County, Cal.

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MR. W. J. WOOLLEY, who took out a Canadian Patent some four years ago, is requested to call at the MINING AND SCIENTIFIC PRESS PATENT AGENCY OFFICE. Business of importance.

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CITY AND COUNTY OF SAN FRANCISCO, ss.

On the twenty-fourth day of May, A. D., one thousand eight hundred and seventy-eight, before me, J. Robert Read, a notary public in and for said city and county, residing therein, duly commissioned and sworn, personally appeared William H. Birch and John Argall, known to me to be the persons described in, whose names are subscribed to, and who executed the annexed instrument, and they acknowledged to me that they executed the same.

In witness whereof I have hereunto set my hand and affixed my official seal, at my office, in the city and county of San Francisco, the day and year last above written.

J. ROBERT READ, Notary Public.

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PERSONAL NOTICE

Must be served as provided in the following quotation from the law:

"The notice must be personally served upon each stockholder, or in lieu of personal service, must be sent, through the mail, addressed to each stockholder at his place of residence, if known, and if not known, at the place where he principal office of the Corporation is situated."

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Notice is hereby given, that at a meeting of the Board of Directors, held on the third day of May, 1878, an assessment (No. 3), of three (\$3) dollars per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the Company, 641 Sacramento Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the eighth day of June, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the twentieth day of June, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

D. A. BROWN, Sec'y

Office, 641 Sacramento Street, San Francisco, Cal.

Cherokee Flat Blue Gravel Company.

Location of principal place of business, San Francisco, California. Location of works, Cherokee Flat, Butte County, Cal.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 39), levied on the seventeenth day of April, 1878, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Am't.
J. Bandman	11	320	\$ 16 00
A. Caselli	17	4608	230 40
Flint, Peabody & Co.	19	480	24 00
Flint, Peabody & Co.	20	100	8 00
Pfaffner, E. J.	10	480	24 00
Schmidt, Louis	8	128	6 40
Winans, Jos. W.	32	1844	97 20

And in accordance with law and an order of the Board of Directors, made on the seventeenth day of April, A. D., 1878, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of said Company, on Tuesday, the eighteenth day of June, A. D., 1878, at the hour of two o'clock p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. W. CLARK, Sec'y.

Office, Room 6, No. 313 Pine Street, San Francisco, Cal.

Excelsior Silver Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Potosi District, Lincoln County Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 10), levied on the twentieth day of April, 1878, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Am't.
J. Antonovich	234	100	\$25 00
A. W. Lind	254	50	12 50
M. Michelson	209	44	11 00
J. Michelson	263	100	25 00
H. M. Pearce	248	100	25 00
L. T. King	262	50	12 50
Adolph Wirtner	252	25	6 25
Adolph Wirtner	253	25	6 25
Salvator Russo	239	25	6 25
Peter Wiese	115	50	12 50
Peter Wiese	219	10	5 00
Peter Wiese	220	10	2 50
Peter Wiese	257	30	7 50

And in accordance with law and an order of the Board of Directors, made on the twentieth day of April, 1878, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the office of the Company, 304 Post Street, on the tenth day of June, 1878, at the hour of one o'clock p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

FRANCIS P. DEVINE, Sec'y.

Office, 304 Post Street, San Francisco, Cal.

Gover Mining & Milling Company.

Location of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the twenty-fourth day of May, 1878, an assessment (No. 35), of fifty cents per share was levied upon the capital stock of the corporation, payable immediately in gold coin or legal currency of the United States, to the Secretary, at the office of the Company, Room 8, No. 402 Front Street, San Francisco, Cal.

Any stock upon which said assessment shall remain unpaid on Wednesday, July 1st, 1878, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Thursday, the first day of August, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

W. O. WILSON, Sec'y.

Office, Room 8, No. 402 Front Street, San Francisco, Cal.

Summit Mining Company.—Location of

principal place of business, San Francisco, California.

Location of works, Mineral Point Mining District, Plumas County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the third day of May, A. D., 1878, an assessment (No. 3), of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of said Company, Room 6, No. 313 Pine Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the eighteenth day of June, A. D., 1878, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on the Monday, fifteenth day of July, A. D., 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

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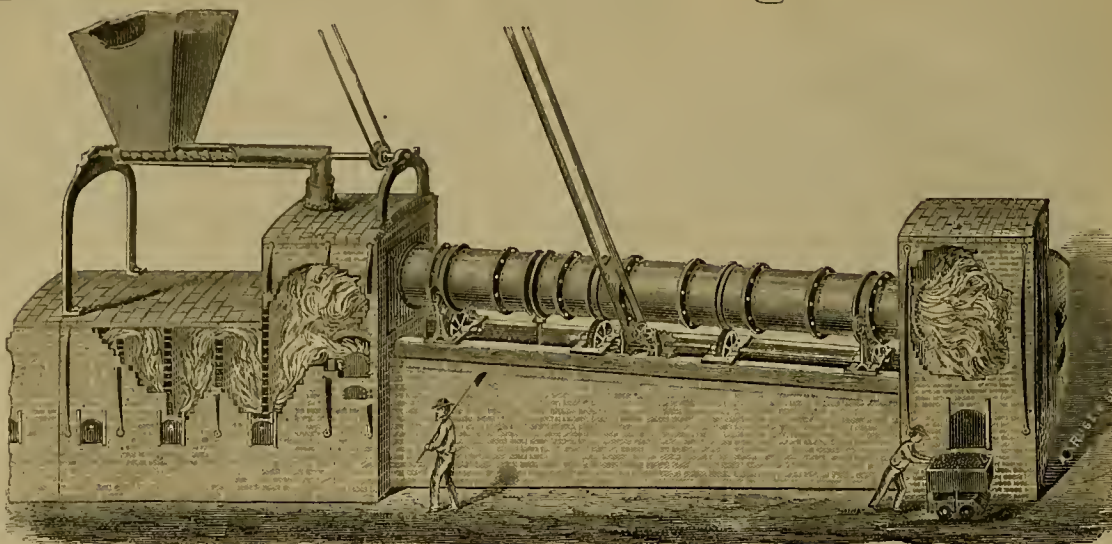
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SAN FRANCISCO, SATURDAY, JUNE 8, 1878.

VOLUME XXXVI.
Number 23.

Pacific Coast Insects.

We learn with regret that the vicissitudes of life lead one of our most distinguished citizens, Mr. Henry Edwards, to break up his residence upon this coast and find a home elsewhere. We shall lose a man of genial and genuine character and of distinguishing eminence in his branch of scientific research. We shall lose a source of light which, at this time, we most need, because no one knows so well as he the insects which are making inroads upon our agriculture, and no one could have been freer in communicating the results of his studies for the public good.

During the score or more of years that Mr. Edwards has been studying Pacific coast entomology, he has been building up a collection of insects until he has now, we believe, 60,000 species, properly arranged and named. These include all typical forms. This collection is the one which the late Agassiz so much admired, when he visited this coast, and wished to secure for Harvard University. Although we might speak at length of the scientific value of such a collection of Pacific coast insect life, this does not comprise its greatest value from our point of view. We look upon the collection more from the side of practical value. We do not mention the so-called "museum" features of the collection at all. It is rather as a means of educating us and our children in a knowledge of insects which they must master or the insects may master them. A collection like that of Mr. Edwards is to the student of entomology what a library is to all of us. It is so much knowledge stored up, classified and always accessible. We must have entomologists and if Mr. Edwards retires from the field, others must come up to do and extend his work as each new year may require. If these followers of his have his collection for reference, and by it to study each new pest which makes itself known by its evil work, they can learn in a few moments necessary points which otherwise they might have to search for far and wide before they found them. We can ill afford to lose this advantage in our future struggle with injurious insects. Although Mr. Edwards has made his entomology a labor of love during all these years, and counts his times nothing, he cannot afford to lose the money actually expended in its material result, the collection. It has a value elsewhere and he must realize elsewhere if not here. He will part with it for simply the amount of money invested in its material making up, if it be bought for the public benefit, and that is \$12,000. It has been proposed to raise the money among citizens who can well afford to give of their wealth for securing the collection for the University or some other public institution. Four citizens have subscribed one-half the amount, \$6,000, providing the balance can be raised by voluntary contribution. Here is a chance for our men of wealth to put a little of their money where it will be a lasting benefit. We trust they will not be backward in contributing toward securing the collection and placing it for the public good. It ought not to be allowed to leave the State.

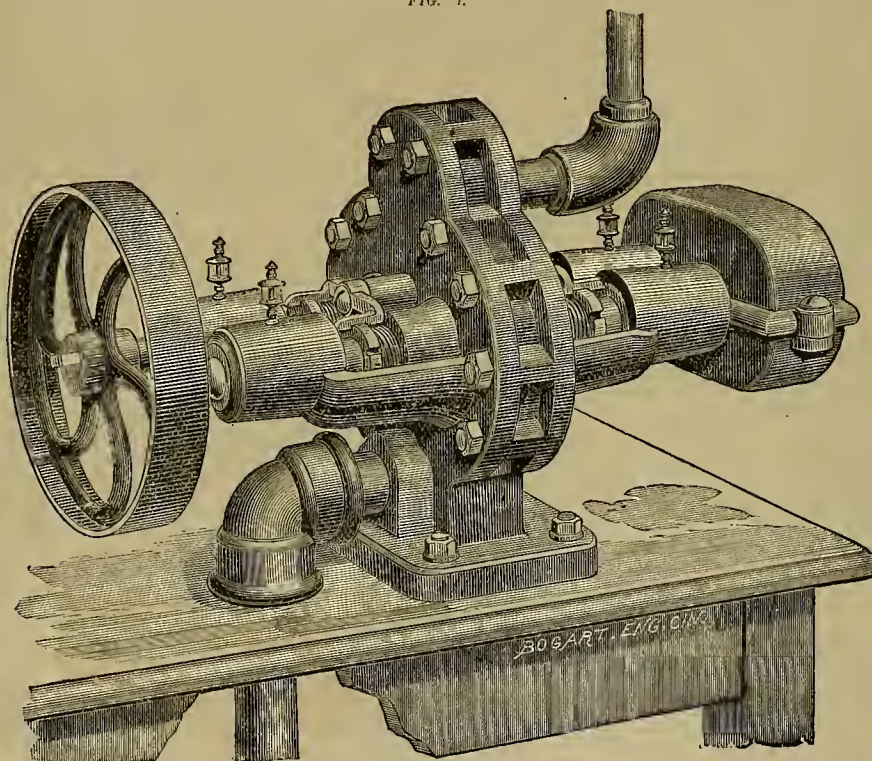
MECHANICS' INSTITUTE ELECTION.—The annual election of the Mechanics' Institute took place on Monday, for the election of seven of the fourteen persons constituting the Board of Trustees. The election was one of the most exciting the Institute ever had, party feeling running high and a strong force of voters turning out. The election resulted in favor of the Opposition ticket, by the following vote: Regulars—L. B. Benchley, 266; Jonathan Kittredge, 269; James Drury, 267; David Kerr, 266; George H. Hopps, 271; J. A. Bauer, 266; J. K. C. Hobbs, 265. Opposition—D. A. MacDonald, 301; Robert Sherwood, 298; Samuel H. Wheeler, 308; Samuel Dinmore, 309; Edward McGrath, 293; Adolph Schmolz, 295; H. L. Davis, 304.

ALL the Powers have accepted invitations to the Peace Congress, wherefore matters look much more pacific in Europe.

THE JUSTICE OVERWINDER.—An apparatus to prevent the overwinding of hoisting cages is in operation at the Justice mine and is found to work to a charm. It has been in use two or three days and never fails. Day before yesterday while two cars loaded with rock were being hoisted, Superintendent Curtis directed the engineer to turn on all steam, stand back from his engine and let things take their course. The cage was coming up at lightning speed—everything just bouncing—and the engineer's hands were twitching nervously, when, at the depth of 100 feet below the top of the shaft, the cage moved a lever and half the steam was shut off at the engine. A moment after the cage was ascending at a moderate speed and presently appeared at the mouth of the shaft, passed the proper stopping place and moved on upward toward the sheaves. Just before it

THE LATE INDIAN SCARE IN IDAHO.—The facts in regard to this business, says the *Idahoan*, were as near as we can learn, about as follows: Some 150 Bannocks, men, women and children, with their tents and baggage, with permits from the agent at Fort Hall, while on their way to eastern Oregon, killed a few cattle and otherwise trespassed upon the property of citizens, behaving defiantly when demonstrated with, without committing violence upon persons. They do not appear to have been generally armed, and the fact that they travel with their families and property, forbids the idea that they intended a hostile demonstration. The cattle owners were, however, exasperated and the inhabitants alarmed, and a slight indiscretion might have produced deplorable consequences. But the Indians having passed into Oregon, the Governor and Major Collins

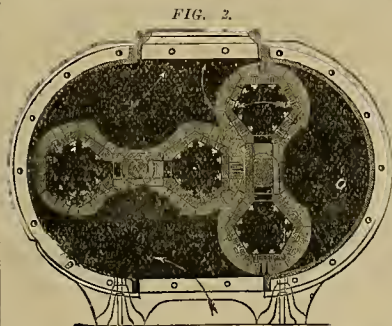
FIG. 1.



ROOT'S ROTARY HYDRAULIC ENGINE.

reached the point of danger, however, the cage pressed another lever, a powerful brake was applied to the hoisting reel and the cage, with its load, was instantly stopped. All this was done without the engineer moving a hand, and had he been sound asleep the cage would have

stopped just the same. From what has been said above mining men will be able to obtain a good idea of the apparatus and the manner in which it works.—*Virginia Enterprise*.



The Lick Trustees have secured a State patent to the land in the vicinity of the Observatory site on the summit of Mount Hamilton.

agents permitting large bodies of Indians to roam over the country committing robberies and terrifying the inhabitants, should be forbidden by the authorities at Washington. Under this most reprehensible practice, another Indian war may, through sheer accident or imprudence, be precipitated upon us at any moment.

Root's Rotary Hydraulic Engine.

The attempt to produce rotary motion by means of revolving instead of reciprocating members has often been made by inventors for centuries past, the greater speed and steadiness of motion, the simplicity and fewness of parts and the directness of application being desiderata well worthy intelligent and persistent effort. To this search for something needed, we owe the almost countless rotary engines, blowers and pumps, actual and projected, which have, with but few exceptions, accomplished no practical end. All of these are divisible into three or four general classes at most, one of the most successful, whether as a driving or a driven member, being that employing two pistons precisely similar and meshing into each other as true gear-wheels. One of the most practical of these employed as a blower, the *Polytechnic Review* formerly described, more on account of its importance than of its novelty, it being (see Fig. 2) essentially two gear-wheels of circular pitch-line, each having two teeth and playing in a case with semi-circular ends, or sides. The same makers, P. H. & F. M. Root, Connorsville, Ind., now present to the public a machine on the same principle and designed as a driver, even employing it whenever simplicity is a great object in producing reciprocating motion.

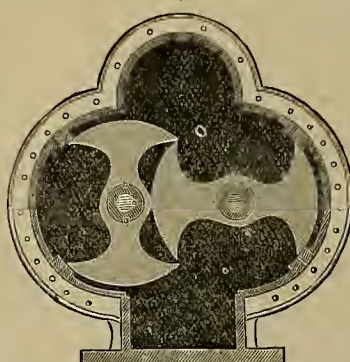
Fig. 1 shows it in perspective and Fig. 3 the principle of its transverse vertical section. As will be seen, there are two pistons or followers, each having two gear-teeth rolled from any suitable curve and at all times closing direct passages through the casing. Thus the passage of any fluid under pressure can only be accomplished by revolution of the pistons in opposite directions. As the leverage and abutments are such that pressure of any fluid tends to cause such revolutions, the application of the device as a hydraulic engine or motor is at once apparent. In the sectional cut the four packing strips are disposed with the intention of producing tightness without that undue or unnecessary friction which would result were the piston peripheries to contact with the whole inside surface of the casing. The set-screws shown permit of adjusting these packing strips as desirable, taking up wear evenly. Spur-wheels without the casing, on the piston-shafts, ensure proper presentation of meshing tooth-faces and that regularity of the piston's action not attainable with two-toothed gears, and which for sewing-machine and organ use is an essential.

The entire absence of valves and complication and the extreme simplicity of the mechanism commend it for many uses (especially domestic) where small noiseless motors, free from nuisance of smoke, steam, gas or acid fumes, are desirable. The shafts are of steel and the interior operating parts of brass. There is an automatic device for starting and stopping.

COMMENCEMENT AT THE UNIVERSITY.—The commencement exercises at Berkeley on Wednesday were largely attended and very interesting. The essays and orations of the graduates were creditable. Formal transfer of the Law College, founded by the beneficent gift of Judge Hastings of this city, was made. The Judge delivered an eloquent address, and response on the part of the trustees was made by Mr. Bishop. At the alumni meeting an able address was made by Samuel Williams, and a poem was read by Mr. Barker. The new building for the college of the Mechanic Arts is progressing finely, and will soon be enclosed.

THE DRAINAGE CANAL.—The engineering party have commenced the survey for the Sacramento River Drainage Canal District. The first camp will be at Denver, Solano county, which will be the headquarters for the time while the soundings of Suisun bay are being made. Col. Isaac Smith is Chief Engineer in charge of the work.

FIG. 3.



CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds

From Arizona.

An Important Land Office Ruling.

EDITORS PRESS:—In March last, a letter was sent from this place to the Commissioner of the Land Office in Washington, suggesting the desirability of an official "ruling" in regard to the actual time when a mining claim is forfeited if the work required under the act of Congress of May 10th, 1872, is not performed.

The special case to which the letter referred was of this nature: A locator had taken up a claim here on February 27th, 1877, and until noon of February 26th, 1878, had not worked upon it. At that hour two men came on the ground and represented that they had arranged with the locator to do his assessment work for the preceding year. A few minutes before the advent of these men, a prospector had relocated the lode in the belief that it was vacant, but the new comers warned him off, and, commencing work, alleged that their resuming possession before the year expired, made the title of the original locator as good as if his work had been fully completed. Here is the Commissioner's answer, the italics representing words which were under-scored in the original:

WASHINGTON, D. C., April 15th, 1878.

Referring to your letter of the 21st ult., I have to state that a mining claim must be located in accordance with the local laws and Congressional enactments, and the amount of expenditure required by local laws must be actually made upon the claim to entitle the party claiming the same to hold it. The Congressional enactment requires that not less than the amount therein specified must be placed upon the claim annually. It is only where parties comply with the local laws and the Congressional enactments that they can legally claim mining land.

Very respectfully your obedient servant,
J. A. WILLIAMSON, Commissioner.

The above is a very important decision and proves conclusively that a person who has failed to do his assessment work, does not in reality "resume possession" of a lode by simply walking a mile or two and setting his foot on the outcrop a few hours before the year expires. He has lost possession by allowing himself insufficient time to complete his work in accordance with the law. If, while there is a default as to labor and the land is necessarily vacant, a locator enters into possession, he will hold it, unless the former claimant renews his title by the requisite expenditure before the year is finished. This decision will make it an unsafe thing in the future for a locator to sit down and do nothing in the expectation that at the end of the assessment year he can get a brother or friend to relocate a claim for him which he has previously held and so control it for another year by merely paying the recording fees. Some one may slip up before him and derange his well-laid plans. If the law could be successfully evaded from year to year in the manner indicated, it would be an easy matter for an active, sharp fellow to hold the mines of an entire district at a nominal cost in money.

The Decay of Ore in Mineral Veins.

I learn from a friend that San Francisco capitalists have little confidence in the mines of this district, because the surface ore bodies, they affirm, decrease in quantity and value in going down 40 or 50 feet. It is quite true that deposits of ore found in quartzite here get smaller and poorer under slight development. What they will prove to be in the deep is only a matter of opinion as yet. In our syenite country rock the lodes are better defined than in the quartzite, but the ore is not nearly so rich usually as in the latter. They too get poorer after running down 20 to 40 feet, but improve again towards the water line. The improvement in the Hannibal, Stonewall Jackson, General Lee, Buckeye, Mexican and other mines that are opened from 85 to 150 feet in depth, is all that could be wished, and we may hope that in the quartzite the same result will follow development. There is nothing peculiar or discouraging in our surface ores not continuing as rich as they are in the croppings. Near the grass roots, the ore that is saturated with water during the winter becomes dry in early summer, and decay or loss of the precious metals is checked. At a greater depth this drying out and preserving process is less effective and disintegration and decomposition goes on the whole year. A firmly-encased fissure will collect more moisture and lose its metal more completely than a deposit protected by the country rock. It may be well to remind those who underrate our mines because they behave in the way referred to, that the same thing has happened in every mining district on the Pacific coast, yielding chloride or free-milling ore. The pioneers of Reese River district will remember how down-hearted mine owners were in 1864, by the "petering out" of their rich surface ores. At a depth of 20 to 40 feet, \$10 assays were common, where the top ore assayed from \$200 to \$2,000 per ton. Until the water-level was reached and preserved sulphuret ore came in, there was nothing permanent about the Lander hill mines, though they are now pointed

to as types of mining permanency. The history of almost every district is the same, and hence the reason why a period of depression and something like abandonment is sure to follow a prospectors' excitement over very rich croppings. The galena and carbonate ores seem to hold out better, but even in the now justly celebrated mines of Ruby hill, in Eureka, Nev., there have been times when false but ready-tongued prophets foretold the absolute exhaustion of some of the best claims. I remember having an argument in 1872, with a person who had been through the works of the Champion mine, of the Eureka Consolidated company, in regard to the prospective value of that property. He asserted that the large surface ore body had first dwindled down to a narrow streak, and then, when followed in various directions for a long distance, had completely given out, never to come in again. I told him that I believed the Champion would be a greater mine 10 years from that time than it ever had been previously, and I still think so.

As to the mines of Globe district, time will prove that they are very valuable, but they must come into prominence by actual money-yielding merit and not by speculative "operating" in San Francisco. It will take years to bring them into a really profitable condition, for the experts who have strutted over our hills for three or four days and told us a good deal more than they themselves ever knew, have made it a hard matter for mine owners to secure financial aid, but time will remedy this evil in defiance of all opposition. J. D. E.

Globe District, May 23d, 1878.

Mining Around Auburn, Placer County.

EDITORS PRESS:—The Jenny Lind at New-castle, perhaps better known as the Schnabel mine, from the name of the proprietor, has been opened to the depth of about 450 feet and has gradually improved from the surface downward. When visited by the writer in 1866, it paid from \$5 to \$6 per ton. It now yields from \$9 to \$10 per ton, and is evidently paying handsomely. Its past history and progress resemble in some respects the Hayward mine of Amador. Its present condition is certainly unusually healthy, while it gives promise of a brilliant career in the future.

The St. Patrick, at Ophir, is represented to contain the richest rock of any mine in the vicinity, and great hopes are entertained for it under its present management. Economy seems to be the order of the day and if it fails to pay, the fault will not be at the door of prudence and energy.

Mr. A. O. Bell, on Bald hill, has pumped the water from his shaft and is preparing to go down in search of another rich pocket. This hill has doubtless a fortune in it for many a man if he only knew where to find it. It is a nice field for some rich company to win or lose a very large amount of money.

The Rock Creek mine, owned by Messrs. Molin & Heenan, three miles north of Auburn, gives a very promising prospect for the depth attained. An incline shaft is now 80 feet deep, the ledge widening from the surface down. At this point it is from three to four feet thick. The quartz contains some sulphurets of lead, iron and copper, and has thus far averaged \$30 per ton. They are preparing to erect hoisting works here to be run by water power. Among the recent enterprises inaugurated here may be mentioned that of

The American River Dredging and Mining Company.

Under the immediate management of Mr. C. P. Chapman, a gentleman of considerable experience in mining matters, besides having much personal interest in the success of the enterprise. The company is made up chiefly of Boston capitalists. The claim is situated a few miles above Auburn on the Middle Fork of the American river—widely known as one of the richest of the many rich streams that gave up their golden sands to the early miners of California.

The particular location is Brown's cut, lying between Kennebeck and Murderers' bars, from which it is stated millions have been extracted in the past. The dredging machine used is similar to the one illustrated and fully described some time since in your columns. But for the benefit of such as may not be familiar with its construction and mode of working, it may be stated in brief, that the dredging part consists of a cylindrical tube which is forced by steam power down into the sand or gravel, and there, the air being extracted, it fills immediately with the contents of the river bed, when it is hoisted to the surface, swung round over a sluice and emptied.

The machine here built will have power to raise 1,000 tons per day of 10 hours (a depth of 45 feet), and will be in readiness for operations about June 10th. In its construction the company have greatly improved on those put up at Oroville, having, evidently, profited by the experience gained therefrom. They have made the scow, for carrying the machinery, shorter, narrower and higher and strengthened it much by trussing and otherwise, so as to sustain hundreds of tons if necessary. They have also lessened the weight of the suction tube at least one-half, and use double the power—a 50 horsepower hoiler by Hodge & Co., Boston, being now on the ground for the purpose. With

these improvements and the rich ground to work, results may be looked for that will astonish the old miners of '49, who, at the most, could handle but about two tons per day.

A. C. K.

The Yellowstone Park.

Protect the Yellowstone Park by all means possible and practicable. It is a creation that no vandal should be suffered to gaze upon. Secretary Schurz's request for \$15,000 to improve and protect it should be granted without a dissenting voice. The report of the Superintendent of the park shows the absolute necessity for a live guardian—one who can shoot. The Superintendent says that the act of March 18th, 1878, set aside and dedicated the Yellowstone National Park for the benefit and enjoyment of the people, and provided formally against trespassers, and for the preservation from injury and spoliation of all timber, mineral deposits, and natural curiosities and wonders within it, and their retention in their natural condition; also against the destruction of fish and game and for the construction of roads and bridges therein. No appropriation has as yet been made to execute this legislation within my personal knowledge, which is confirmed by official publications and those of travelers. Valuable forests of pine and cedar timber have been prostrated and travel impeded by the careless use of fire. Bison, elk, antelope, bighorn sheep, and other beautiful and valuable animals have been slaughtered by the thousands merely for their tongues and pelts. Great masses of ancient timber, fossils, geysers, cones, and beautifully scalloped pool borders which made the region valuable have been broken up to obtain transportable specimens, which have been made articles of fraudulent commerce. The preservation of these animals and wonders, and the construction of roads, bridges, etc., are necessary to carry out the act. The opening of the great Yellowstone route by steamboats, and the approach of several railroad routes, in rapid construction toward it, show the immediate need of practical means, both to preserve the park from irreparable damage, and to make the beauties enjoyable.—E. C.

COMPRESSED AIR FOR MOTIVE POWER IN CITIES AND IN MINES.—The advantages of compressed air over steam in mines are, that it assists rather than injures the ventilation, keeps the air cool, and avoids the injurious effect which steam exerts on timber and on certain kinds of rocks. In the cities, compressed air will not frighten horses as much as the puffing of a steam-engine, but it is not pretended that it will be less expensive. It would avoid the labor of firing and the annoyance of ashes and coal-gas that are the most disagreeable features of the steam cars on our elevated roads. We confidently expect to see mechanical means take the place of horses for motive power in cities, and it seems probable compressed air may be the most convenient agent, with reservoirs for compressed air located at intervals throughout the city, and engines attached for compressing the air. These might be placed in vaults under the sidewalks, and carriages and wagons could be arranged with reservoirs, which could be charged as often as desired at these street reservoirs, an operation which would occupy but a few minutes; and it would require but a very small reservoir to contain, under the very high pressure assumed, sufficient power to run a carriage three or four miles. The saving in pavements and horse-flesh and in the keep of horses would, in a single year, probably pay the entire outlay required.—Engineering and Mining Journal.

BENTON.—Concerning this town, located in the southerly part of Mono county, the Carson Appeal remarks as follows: There are about 600 persons in and around Benton, the greater portion of them being engaged in assorting ore and in other departments of mining. Idlers or non-producers are scarce in Benton. Work in the Comanche mine, the oldest location in this quarter, is for the present abandoned. The Carrick mine, owned by the Comanche mill and mining company, is turning out a daily average of ten tons of very rich quartz, which is being crushed at the Comanche mill. The Carrick mine employs about 20 men. The Diana company, working about 30 miners, is taking out rich ore, which is being reduced by the company's five-stamp mill. Several smaller mining companies are also getting out ore, and generally doing well. Benton, for the benefit of those not geographically posted, lies about 50 miles in a southerly direction from Aurora.

DON'T GO THERE.—The United States Consul at Buenos Ayres, the capital of the Argentine Republic in South America, warns people in the United States not to come to that country with much expectation of bettering their condition, and not to come at all unless they have money enough to get home with in ease they do not find some employment or business. The Consulate is flooded with Americans who have been disappointed in not finding work, and who have no means of getting back to the United States.

It is said by those who claim to be posted, that a bonanza of large proportions has been uncovered in the Independence mine at Tuscarora, and that the company will declare a dividend next month.

Black Mountain District.

Concerning this locality, situate in Esmeralda county, Nevada, a correspondent of the *Stock Report* writes as follows: Work on the various mines here is progressing steadily and prospectors swarm on every hillside, all meeting with good success. The principal mines being worked at present are the Endowment and Combination, incorporated and having their offices in your city. The Endowment Co. has been operating a little over a year, and with such success as to require an enlargement of their five-stamp mill—heretofore the ore has been of such a character that it could be profitably worked by raw process; as depth is gained it is found necessary to roast it, wherefore the Endowment Co. is putting up a 10-stamp mill with Howell's improved roaster, which is being pushed to completion under the management of the most experienced mill men. Their mine is in splendid condition, having several fine bodies of high grade sulphuret ore assaying up in the hundreds. They expect to have their mill completed and running in a short time, when this mine will come to the front as one of the solid bullion producing mines of the coast.

Adjoining the Endowment and on the same lode is the property of the Combination Co. It is but recently that active operations have been going on in this mine, which is efficiently and economically managed. With but a small force, a working tunnel, upwards of 600 feet long, has been driven in the mountain, and crosscuts have developed a fine ledge at a depth of about 400 feet, proving in its character and extent fully as good and extensive as the adjoining mine. Ore bodies have been opened up here that would amply repay the expenditures necessary for a mill, but the management pursue the wise policy of first proving their mine, so they can understandingly build what is necessary. Exploration still continues with success in the main tunnel, but aside from that several smaller workings have been opened showing up splendid ore; in one prospect tunnel they have got a streak of ore assaying from \$200 to \$600 per ton, and increasing as depth is gained on it. Should developments of the next few months equal those of the past the Combination will equal if not rival its fortunate neighbor, the Endowment. It will take time and many a hard knock and not a little money to thoroughly develop all our promising claims, and should your capitalists devote but a trifle to this section that is thrown away on so-called bonanza countries their dividends would not all be left-handed.

Solid Silver.

The Salt River (Arizona) *Herald* of the 18th says: Two prospectors arrived, a few days since, at the Agua Fria smelter, 20 miles east of Prescott, with 280 pounds of ore, which was interspersed with native silver, in the shape of wire, spikes, feathers, daggers and all conceivable forms twined in together, constituting the handsomest lot of silver specimens ever found in any country. The smelter put the mass through and the result was found to be 110 pounds. The ore is from a new camp, between 20 and 40 miles southeast of old camp Reno, Maricopa county, in the Sierra Ancha mountains. There are some 15 men in the camp, which is situated at the head of Cherry creek. Messrs. Golen and May, the two prospectors above mentioned, found a large dyke, capped over with iron, and, about 20 feet from it and running parallel with it, a stringer which showed chlorides and considerable horn silver. They began to open it and found the rock very much decomposed on top and quite rich. They took out about a ton and a half, which they considered worth \$3,000 or \$4,000 to the ton, before the rock began to harden, but at a depth of a few feet the ledge or seam became solid, the carbonates and chlorides gave out and bright native silver made its appearance. At one point it was four inches thick, wedged-shaped, with the big end up. They took out the most of what they could find of this character, as before mentioned. They will return and sink about 100 feet on the stringer, when, if it does not at that depth join the main ledge, they will cut across it and explore it below the iron cap, with the expectation of finding a rich streak somewhere in it. The ledge matter in the stringer contains native silver in small quantities throughout, but not enough to make it an object to work for that alone. It is quite likely that in sinking this streak will open out again.

ANOTHER PROCESS.—William Shewan, an old amalgamator, claims to have discovered a process by which ores can be worked without the use of tanks of any kind or slum reservoirs and will yield a greater percentage of returns than the old methods, while the mills may be worked to their usual capacity. Such a process would reduce the cost of milling by at least one-third, and Mr. Shewan should lose no time in making it known to some competent mining or mill man.—Virginia Chronicle.

SULPHATE OF MAGNESEA.—An epsom salts mine has been discovered about 12 miles from Chattanooga, Tenn. The deposit is two feet thick and is easy of access. It is pure and only requires crushing to make it marketable.

HEAVY shipments of quicksilver are made almost daily from Calistoga, California, and there are good indications of a revival soon of work in nearly all the mines in Sonoma county.

MECHANICAL PROGRESS.

ELECTRIC LIGHT.—A large number of prominent gentlemen, says the *Railway World*, assembled at the Pennsylvania depot, West Philadelphia, last week, to witness the experiment of illuminating that huge structure by means of the electric light. The experiment proved a brilliant success. A newspaper could be read with comparative ease at a distance of 100 feet from the light, and the shades of color in clothing were also distinctly visible at the same place. The gas lamps burned dim and yellowish in the intense whitish glare, which rendered the depot almost as light as day. In the machine used the light is produced by electricity generated from the apparatus, which consists of four magnets with an armature rapidly revolving between them. The power is from a steam engine, which drives a shaft on which the armature revolves. The shaft makes 1,100 revolutions per minute, and the current is taken from the commutator by a simple arrangement, and from thence carried to the wires. These wires are run through the building and connected with lamps of a special invention. The light is produced by the combustion of carbon by a contrivance by which the current of the machine is made to regulate the lamp. The upper carbon burns at the rate of a little over an inch an hour, costing for each lamp two cents per inch. This is the sole cost of the machine except the running of the machinery.

TEMPERING FILES.—After the files are cut the necessary hardness must be given them. For this purpose, says the *Iron Age*, the following composition is used: 2 parts (by weight) of salt, 15 parts of rye grist and 30 parts of burnt cow hoofs, all ground together and mixed with a sufficient quantity of water to make a pasty mass, with which the files are covered. When dry they are placed in a fire. If during the heating the coating should drop off at certain places the files are promptly withdrawn and the place exposed is covered with dry hoof powder. It is returned to the fire, where it is left until a temperature is reached which best suits the steel of which it is made. Then the file is plunged vertically into the bath specially prepared for the purpose, care being taken not to move them to the right or left, as that would cause warping and make them unsalable. The bath is made in the following manner: 28 parts of salt are dissolved in about 5 parts of water, to which a handful of iron scale is added. After tempering the files are washed, brushed and dipped into lime-water to prevent rusting. As soon as they are entirely dry the tangs are softened by being plunged into red-hot lead. Whenever it is only necessary to give the files a black color, it will suffice to dip them hot into ordinary oil. Before packing them it is well to paint them with turpentine mixed with white lead and lampblack.

A HILL-CLIMBING LOCOMOTIVE.—We read that an interesting series of experiments are about to be carried out at the Royal Arsenal, Woolwich, to test the efficiency of a special kind of locomotive engine which has been constructed for the new trench railway. This railway is designed to be laid upon the surface of the ground wherever it may be found necessary to construct earthworks or to transport material, the ordinary methods of reducing irregularities by cuttings and embankments being out of the question in field operations. The engine is, therefore, designed to ascend and descend sharp gradients, and is also fitted with an apparatus for hauling up and lowering loaded trucks. A hill too steep to be ascended with a load behind may be surmounted by the engine alone, and it may then wind up the load after it. An experimental railway running up and down hill in irregular fashion is being formed near the butts in the Government marshes adjoining the Royal Arsenal, for the purpose of the trial.

THE LARGEST ELECTROTYPE EVER PRODUCED.—The Electro-Metallurgical Company of Brussels, has lately completed a colossal statue of Jan van Eyck, in bronze, by the system of electric deposition. The galvanic process occupied several months, although a thickness of but six to eight millimeters was attained. It is probably the largest object which has been produced by this method, being over 12 feet in height, and is regarded as a much more perfect imitation of the model than could be obtained by casting.

GALLIUM WORKING.—Gallium is a hard and malleable metal; it takes under the hammer the polish of the anvil, but rapidly grows harder and brittle, and is then liable to fly to pieces. In spite of its relatively considerable hardness, gallium leaves on paper strongly-defined marks of a bluish-gray color. It retains its luster in the atmosphere of a laboratory constantly loaded with acid vapors, and undergoes no alteration in appearance in boiled water. In aerated water it tarnishes slightly.

A STRONG BOX.—The silver vault now in course of construction in the Sub-Treasury will be 47 feet in length by 24 in breadth and 12 feet high, and will hold \$40,000,000 in silver when finished. The cost of the iron and steel work employed in its construction was about \$20,000, including the doors and their levers. The floor of this vault will be iron and steel two inches thick, and under this will be four feet of concrete.

Locomotive Boiler Building.

As we have noted before, the Master Mechanics' Association of the Eastern States has been at work, during the last year, collecting facts and opinions concerning the best material and design in building locomotive boilers. Although we are not building locomotives on this coast, our mechanics will be glad to know what is considered the best practice at the East. In its report of the last meeting of the Master Mechanics' Association, the *Railroad Gazette* notes the points made by the committee charged with this investigation:

In answer to the question, "Which have you found to be the best material for the shell of the boiler, iron or steel?" the preference is very decidedly in favor of steel. The committee say: "Those who have used it longest are most decided in their preference for it."

"In regard to the best thickness of metal for the sheets of a boiler, from 48 to 52 inches in diameter, to carry a working pressure of 130 pounds of steam, the opinion was unanimous that in the case of steel, three-eighths inch was sufficient and the best thickness to be adopted, taking all things into account, and in the case of good iron, from three-eighths to seven-sixteenths was considered the best thickness of metal."

To the question, "What is the best form of boiler for the ordinary eight-wheel American style of locomotives?" the committee find that a majority prefer the plain or straight boiler, sometimes called the telescope boiler. "Distortions of every kind," say the committee, "should be avoided in the form of the boiler whenever it is possible to do so, for the reason that the pressure within tends to change the shape or form at such points unless strengthened by stays or braces: therefore the form nearest a plain cylinder will be the strongest and require less bracing, other things being equal."

"With the use of comparatively pure water, forming no scale of consequence, a dome would, perhaps, be unnecessary where the steam-space above the water was sufficient; yet, as an opening of some kind large enough to permit access to the inside of the boiler is a necessity, such opening, as regards weakening the shell of the boiler at that point, is, perhaps, as objectionable as a dome. If the former can be made so as not to weaken the boiler, there is no reason why the dome cannot be attached in such a way as to be equally as strong at that point by flanging the sheet upward inside the dome and the addition of a ring of suitable proportions riveted to the inside of the boiler at the foot or flange of the dome."

To the question, "At what point on a straight boiler should the dome be situated to give the best results, all things considered?" not much difference of opinion is expressed in the answers sent to the committee. "All agree that it should be either directly over the tube-sheet of the fire-box or at some point between that and the middle of the length of the boiler. There seems, however, to be no good reason for locating the center of the dome any further forward than the tube-sheet in the ordinary eight-wheel locomotives, for the reason that it is desirable to carry as much of the weight of the boiler on the drivers as possible and also that that point is the most central from the points where steam is generated."

The best material for fire-box sheets? The testimony is unanimous in favor of steel.

On the subject of ruptures the committee say: "Mr. Woodcock, of the Central Railroad Co. of New Jersey, mentions one case of a rupture of a side sheet while the boiler was being filled with warm water"—the first case of the kind coming to the notice of the committee. After considering Mr. Woodcock's account of this novel occurrence the committee submit the following explanation: "The sheets of the fire-box and the mud-ring having cooled off to about the temperature of the surrounding atmosphere, when water at a considerably higher temperature than the mud-ring was allowed to fill the water-space, and as it rose upward along the sheet, the latter, being thin, soon became of the temperature of the water in contact with it, and expanded in proportion to its temperature, while the much larger body of metal remained comparatively cold, and, being cold, would be shorter than on the line which had become warm from the water in contact."

As a remedy for ruptures, corrugations or channels in the sheets at points liable to such strains are recommended.

The cost of repairs of boilers, the committee report, is very largely influenced by the character of the water used in them; and the committee believe "that it would be economy in the end to spend comparatively large sums of money in many instances in order to procure water that is free from ingredients forming these injurious and objectionable deposits."

In relation to cleaning out boilers the drift of sentiment seemed to be against blowing off, and in favor of allowing the boilers to cool down and then to wash them out with warm water from hose.

CULTIVATING THE YANKEE PROCLIVITY.—A "Whittling School" has been opened in Boston, with the design of familiarizing boys with the use of tools. There are between 30 and 40 pupils, and more applicants than can be accommodated. The tuition is free, and practical woodcutters are engaged to give instruction. The course includes 24 lessons, and is only designed to direct the talents of natural "whittlers"—not to make finished workmen.

SCIENTIFIC PROGRESS.

The "Challenger" Investigations.

Those who have been waiting for the official record of the famous *Challenger* deep-sea explorations can now be gratified by a work published in two volumes by Harper & Bros., of New York, which is entitled "The Atlantic," and gives a preliminary account of the general results of the exploring voyage of H. M. S. *Challenger*, during the year 1873, and the early part of the year 1876. The author is Sir Wyville Thompson. The descriptions of methods employed and locations explored is accurate, and the results are fully detailed.

By means of constant use of the trawl it was found that while vegetable life ceased to exist at a depth of about 150 fathoms, no depths were too deep for the presence of animal life. The absence of light, and the presence of cold which comes very close to the freezing point, do not appear to be insurmountable objections. Of course the types of life are low at great depths, consisting largely of *Foraminifera*, of which the minute *Globigerina* form an important part. So numerous are these little animals that from 500 down to 2,000 fathoms the sea bottom is invariably composed of what is called "globigerina ooze," consisting of the shells of globigerina. So that at these depths the sea is at the present time, as it has been for ages past, laying down a deposit of chalk exactly similar to that which makes its appearance in England. At the depth, however, of 2,500 fathoms or more, the bottom is a pure red clay, from which the carbonate of lime has entirely disappeared. Sponges and stalked crinoids are found in the deep-sea fauna, but it is mainly composed of very minute organisms. An entirely new family of these was discovered and named after the ship, *Challengerida*.

But the most important results were obtained from the observations made upon Atlantic currents and upon the temperature of the water at different depths. These two subjects are so closely related that neither can be properly understood without reference to the other. The fact that the temperature at 1,000 fathoms depth may be several degrees higher at one point than at another is due entirely to the currents. Were the waters stationary there would be uniform temperature throughout the ocean at the same depth and in the same latitude. It would also be true that the water would be hotter at the equator than anywhere else. But with a surface temperature from 25° to 27° centigrade, at a depth of 300 fathoms the thermometer has fallen lower than it does either north or south of the equator. The isotherm of 4° C., which in latitude 22° N. lies at a depth of 700 fathoms, has at the equator risen within 300 fathoms of the surface. South of the equator again it falls to a depth of 400 fathoms. The simple explanation of this is that Arctic and Antarctic under-currents are flowing toward the equator and rise there in order to replace the water drawn away by surface currents toward the poles. These deep under-currents are colder in the South Atlantic than in the North, for the reason that the great South Atlantic basin of which we have spoken opens out much more freely toward the pole. One curious circumstance will strike the reader, and that is that "the mean bottom temperature of the seven deep soundings (in that part of the ocean) is 0.4° C." and in some places goes as low as 0.6° C., which is equivalent to 31° F., or one degree below the freezing point.

PRIZE BLOWPIPE APPARATUS.—Some months ago we announced a prize of \$250, offered by the English Society of Arts for the best set of blowpipe, in a case, which could be sold for one guinea. The prize has been awarded to Messrs. Letcher Bros., of England, and they have deposited a standard box with the Society of Arts, which the recipients of the prize undertake shall be equaled by every box sent out. The apparatus and reagents are contained in a stained deal box, 10½ inches by 4½ inches by 3½ inches, which weighs, when full 3 pounds 9½ ounces. The box is provided with lock and key. It contains 42 articles—blowpipe, spirit-lamp, grease-lamp, hammer, anvil, pestle and guard, platinum forceps, brass forceps, lamp tweezers, test tube holder, chisel, magnet, file, scissors, cupel striker, hone spatula, platinum wire, platinum foil, tin foil, magnesium ribbon, pastille and cupel holder, charcoal pastilles, boiling dish, open tubes, closed tubes, glass rod, blue glass, litmus paper, turmeric paper, Brazil wood paper, soda paper, carbonate of soda, microcosmic salt, borax, bone ash, fluor-spar, assay lead, nitrate of cobalt, bisulphate of potash, oxide of copper, chloride of silver, and potassium iodide and sulphur. The packing is so arranged that the greater part of the apparatus and reagents are contained in a wooden block, with a variety of holes and recesses, each receiving a separate article. It is, therefore, simply necessary to lift out the block and everything is set free, for none of the pieces of apparatus in any way interfere with each other. The repacking is effected quickly and easily, as each article fits into its own place and an unfilled opening at once indicates that something is missing. If ordinary care is used, therefore, the traveler need not be afraid of leaving anything behind. No paper, wadding or pads are required and yet the contents of the box are securely packed.

Experiments on Color Blindness.

A valuable note has been presented to the Royal Academy of Sciences of Belgium by Prof. J. Delboen and D. Spring on natural and artificial color blindness. In order to explain the curious phenomenon of color blindness, or Daltonism, Young and Helmholtz have formulated the following hypothesis: The eye possesses three kinds of nerve elements, which, excited separately, cause the sensations of red, green or violet, these colors therefore being the subjective fundamental ones. The colors of the spectrum as well as compound colors would accordingly have the property of exciting, simultaneously, but in varying proportions, each one of these specific energies; red, for instance, would only feebly affect the violet and green elements, but would strongly agitate the red ones. It would be understood from this theory that no natural color, however it may be, even though it were one of the colors of the spectrum, which are acknowledged to be the purest we know, would create a truly simple sensation; the colors seen always comprise red, green or violet, although the true color may contain only one or two of them. This hypothesis applied to color blindness would give as the cause of the phenomenon the absence of one or two of these three energies, the most frequent being that of the red. Without discussing the objections which may be made against this hypothesis, a modification may be added which naturally suggests itself. It is possible that with those who are color blind the red elemental nerves are not entirely paralyzed, but that the green and violet simply predominate. If this supposition were correct, it would follow that in placing between the eye of one color blind and the light a transparent substance colored red, it would be possible to establish the equilibrium, because by such means a part of the green and violet rays is extinguished. The substance first used was fuchsine. Experiments were made with silk ribbons, chosen by a person who was color blind. It was notably a bright red which he could not distinguish from a certain brown, and a violet which made upon him the same impression as blue. The interposition of fuchsine prism produced a remarkable effect upon all color-blind persons examined. The colors which they confounded usually were not only notably different, but the color and tone of blue or brown remained almost intact; while violet, and especially red, acquired an aspect and a brilliancy entirely unknown to them.

TRANSMISSION OF SOUND.—*Nature* says that Prof. Hughes, the well-known inventor of the type-printing apparatus so largely employed on the Continent, has made the wonderful discovery that some bodies are sensitive to sound as selenium is sensitive to light. If such a body be placed in the circuit of a small battery it will be so affected by the sonorous vibrations when spoken to as to replace entirely the transmitter of a Bell telephone. Conversation, music, and all the sounds transmitted by an ordinary telephone are easily reproduced. A mere scratch with the finger-nail, or a touch with the soft part of a feather, is distinctly transmitted. The sonorous vibrations produce strains in the conductor, which cause variations in the resistance of the circuit.

THE TOTAL ECLIPSE OF THE SUN.—On the 29th of July next a total eclipse of the sun takes place under such circumstances as to present opportunities that occur scarcely once in a generation, for the study of some of the most interesting phenomena with which astronomers have to do. The path of the totality of this eclipse runs diagonally across the center of the United States from Montana to Texas, and is somewhere about 140 miles wide. Many of the best points for observing the eclipse are therefore directly accessible by railroad, and several expeditions might be sent out fully equipped to as many different points, without spending so much money upon them all, as it would ordinarily take to equip a single expedition to a more distant point.

A WANING STAR.—The "new star" which appeared in Cygnus so suddenly in November, 1876, has now fallen to a small ninth magnitude star; while its spectrum, which, when it was brightest, was a continuous one, with bright lines and bands, has become exactly like that of a faint nebula, consisting of only one single line in the green. According to Lord Lindsay's careful measurements, the wave-length of this line on Augstrom's scale is 4,986, which coincides sensibly with the strongest line in the spectrum of nitrogen.

AN ATMOSPHERE FOR MERCURY.—Prof. Watson, of Ann Harbor, agrees with Prof. Peters, of Hamilton College Observatory, in finding that his observations on the transit of Mercury, indicate an atmosphere about that planet. He however insists that the time of the contact with the sun shows perturbations due to some force not recognized among the planets commonly accepted, and that Leverrier's planet Vulcan is responsible. He does not expect that Vulcan will be seen until 1885.

LONGITUDE.—A detachment of officers of the U. S. Hydrographic office are now engaged, with the aid of the Brazilian Submarine Telegraph Company's cables from Lisbon to Pernambuco, in determining the longitude of the principal South American cities; notably Pernambuco, Bahia, Rio de Janeiro, Buenos Ayres and Valparaiso.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

COPPER.—*Ledger*, June 1: At the Newton mine improvements are being pushed. Next month they will take the water out of the shaft and resume the extraction of ore. Heretofore roasting operations have been conducted in the open air. That the fumes may not be a source of annoyance to the neighborhood, a dozen roasting furnaces are in course of erection, and the smoke from these will be destroyed by condensation.

PLYMOUTH.—Work at the Hite mine has ceased, the ore being too poor to pay. The Phenix holds its own well. The Alpine mine has been sold to satisfy a judgment held against it by the Bank of California, which bought it in. The ten-stamp mill of the Montecard mine is running on good ore.

CALAVERAS.

GWYN MINE.—*Chronicle*, June 1: The sinking of the shaft here an additional hundred feet, for the purpose of opening a level at the depth of 1,500 feet, is about completed. The shaft is cutting the largest and best ore body yet discovered in the mine. So far as the permanency of the ledge is concerned, that was established years ago; still, the fact that no drifting will have to be done to find the ore body in the 1500 level is encouraging. The batteries are kept engaged on rock from the 1400 stopes, the yield of the mine continuing steadily at largely remunerative figures.

UPPER COUNTRY.—Champion, at West Point, stoping. Excellent rock and lots of it. San Bruno, Mosquito, closed down. Blue Jay driving ahead with customary vigor. Plenty of good rock. The new machinery on the San Joaquin has been started up and works well. Very active operations on the "John the Butcher" mine. Banner still lying idle.

EL DORADO.

PLACERVILLE QUARTZ CO.—*Mountain Democrat*, June 1: Last week a survey of this mine, formerly the Pacific, was made, including the new shaft and the drifts and stopes on the 300 level, and the tunnel through which the old incline was worked. A cave at the head of the tunnel, which defied the efforts of former owners to penetrate, and which resulted in the sinking of what is known as the new shaft, has been caught up and securely timbered to the hanging wall. The head of the incline is open, and, though full of water, it appears to be all sound. Operations have been commenced to drift from the shaft, at the depth of 220 feet, to the incline. This will afford the necessary ventilation, and the work of stoping can at once be proceeded with. From the shaft, on the 300 level, there are four drifts, north, south, east and west. There is also a north drift from the west drift. The west drift runs through to the slate. The east drift, 90 feet in length, is all in green stone, and in this, as well as in the west drift the walls are full of quartz stringers, sometimes reaching the dimensions of respectable ledges. Some stoping has been done in the north drift and a winze sunk about 20 feet. In the bottom, where the ledge is four feet wide, there is lots of free gold in sight. From a blast put in here, Monday, some very rich specimens were obtained. The dust from the drill-hole prospected splendidly. Prof. Price, while here, made a careful examination of the mine, and left satisfied with its prospects.

FRESNO.

STRUCK PAY DIRT.—*Reporter*, May 25: Duff and Blair have been prospecting during the winter near the old adobe crossing of the San Joaquin, about 10 miles from the toll house, and have struck what they believe to be a real bonanza of pay dirt. They will build a ditch some two miles long, much of it flume, which will cost about \$1,500, and hope to be able to begin washing by the middle of June.

INYO.

NEW COSO MINE.—*Coso News*, June 1: One of the new furnaces here was started on Monday, May 20th, and has been running ever since, with some interruptions caused by labor troubles and the inexperience of some few of the employees. However, they have done very well. Up to this morning at 7 o'clock, there have been smelted about 200 tons of ore, producing 32 tons of bullion, the gross value of which here (lead and silver) amounts to \$14,006.46. The large, or 50-ton (No. 3) will probably be started some time next week, and perhaps the third one (No. 2). The amount of coal that has been used is about 25 to 30 bushels per ton of ore, 5% of iron ore, very little lime, and about 25% of slag. An improvement on these figures may be expected next week, as Mr. Williams will have become better acquainted with the ores and the efficiency of the furnaces.

MONOC CONSOLIDATED shipped 20 tons of their rich bullion last Thursday, and had remaining at the furnaces 16 to 18 tons, all of which was the product of the furnaces for the preceding three days—the average being about 12 tons per day. Both furnaces are running and turning out bullion daily at about that rate, the bullion retaining its usual high grade. They are now taking out large quantities of ore from the levels 50 feet below the Confidence level, a large por-

tion of which carries the rich horn-silver, the native chloride of silver, or kerargyrite. Sinking on the ore body on the 1000 level is progressing satisfactorily, and is looking splendidly, hiding fair to exceed the expectations of all.

DEFIANCE.—Both the furnaces started up last Tuesday morning, under the direction of John S. Gorman, and are running nicely. It is believed that ore can be had from the mines in sufficient quantities to supply the furnaces for a long time.

LAKE.

GREAT WESTERN QUICKSILVER MINE.—*Lake County Bee*, May 28: The shipments from the mine, during winter, have averaged 450 flasks per month, and it is expected that 600 flasks per month will be shipped during spring and summer. Mr. Rocca, Superintendent, is putting up wooden furnaces with glass roofing. His nephew has recently arrived from Italy and will remain at the mines. Mr. Robert Armstrong has taken charge of the adobe yard.

NEVADA.

OPENING AN OLD CHANNEL.—*Transcript*, June 4: A company has been formed for tapping the Blue lead under the Town Talk bill. The tunnel is now in 200 feet, with 300 feet more to run before reaching the channel, which is expected to be rich. A perpendicular shaft is to be sunk from the top, to strike the tunnel at the end of the 500 feet, which will afford a free circulation of air for the miners in taking out the gravel.

STARTING OPERATIONS ON THE BYRNE MINE.—Robert M. Fryer, Superintendent of this very valuable property, informs us that work will be started here on the first of June, after which it will be pushed vigorously and without interruption, some 40 or 50 men being employed. The chances for opening up a large paying estate here are equal to any in the county, the gold being here, the company strong and the management good.

PLACER.

RECONSTRUCTION.—*Dutch Flat Forum*, May 27: This is the name of a mining claim located at the mouth of Canyon creek, on the American river, embracing a large piece of ground known as Pickering bar. Being a river mine it can only be worked during the low stage of the water, and as that season is close at hand six men have been engaged for the past few weeks making preparations to have this mine worked through nearly all of the processes known to ancient and modern river mining. Wing dams, pits sunk to bedrock, in which force suction and Chinese pumps will be operated by over or undershot wheels, also tail races, tunnels, etc., will be brought into requisition. This mine is expected to make a good record, as late last fall a prospect hole was sunk to bedrock, from which a small amount of gravel was taken, (heretofore being driven out by the rising of the river,) which yielded \$80 to the car-load. The proprietors are White, Thomas & Co., most of whom reside at Gold Run.

POVERTY BAR.—In the early days of California this bar, on the Middle Fork of the American river, was a place of great repute. Of late years it has been neglected. Now, however, some old miners have gone in again, traced up and found the old pay dirt more extensively than they expected, and are, at present, opening a claim that may re-establish the reputation of the old mining camp. The names of the men of the company are Early, Marks, Cochrane, Wilson and Carroll.

IOWA HILL MINES.—The Independent hill mining claim has been sold to a San Francisco company for \$5,800. The Morning Star mine shut down on Monday to clean-up. Good returns are expected. The Enterprise mine, under the superintendency of D. W. Spear, is progressing finely. They will run two weeks longer and then clean-up.

THE BRUSHY mine has its location two miles south of Gold Run, contains 15 acres of gravel, and is owned by Everhart & Bros. This mine, which has been hydraulic since January 26th, employs nine men and uses 200 inches of water. Several clean-ups have been made, with favorable results.

SHASTA.

FURNACEVILLE.—Reading *Independent*, May 30: The Afterthought mine has shut down, for the reason that the buildings were not sufficiently large to shelter the vast amount of machinery and works that has been necessary to have to work the ore. The carpenters are now busy at work, and the mill will start up again in a few days with everything prepared for a continued work.

SIERRA.

MONTE CRISTO.—*Downieville Messenger*, June 1: The tunnels, with the exception of the Basalt Rock Co., who are washing tailings, and the Empire, sinking an incline into prospected ground, are all paying; some of them handsomely. Towle is yet driving ahead at Echo City in the belief that he will yet, contrary to popular belief, strike a paying channel. Brady & Bro. have returned to Fir Cap, and will work tailings of the Shamrock Co. this summer, some of whose dirt was wonderfully rich. J. Billings, at Sebastopol, is getting good pay in the old Pioneer ground, having lately taken out \$500 from a place less than five feet square. Some parties have lately relocated the old Alma ground, into which they will drive a tunnel. Jas. Alexander, at Reese's ravine, is pipping with remunerative prospects. At Little Grizzly the Los Angeles Co., to whom the mines at that place were bonded for \$60,000 last fall, with privilege of prospecting them until July next,

are driving their main tunnel across the channel expecting soon to strike rock. A shaft 12 feet deep was sunk on this channel some time since, from the bottom of which a drift of 50 feet was run, showing fine prospects with the rock raising slowly towards the main tunnel.

TRINITY.

NUCKET.—*Journal*, June 1: Prater & Fisher found a specimen of heavy gold in their claim, opposite the Arkansas dam, Tuesday of last week. The piece weighed \$92 and was nearly solid gold, there being but two specks of quartz on it. This claim and that of Chapman & Fisher, adjoining, has furnished a number of nice specimens in times past.

PROSPECTING.—Mr. A. L. McWhorter, of Burnt ranch, was in town, this week, and speaks hopefully of the prospects on Lower Trinity. From him we learn that Dr. Fonda is engaged in prospecting Denver bar, by sinking a shaft, and if satisfactory results are obtained, work will forthwith be commenced on a ditch to that point. A company has already been organized for this purpose and \$10,000 capital paid up.

Nevada.

WASHOE DISTRICT.

CALIFORNIA.—Gold Hill *News*, June 5: There is no change in any of the ore-producing sections of the mine, or the quantity of ore extracted and milled. The ore breasts and stopes on the 1650 and 1600 levels continue to show well. Sinking the joint Ophir winze below the 1900 level on the north line is making good progress, considering the extreme hardness of the rock. A donkey engine is being erected to do the hoisting from this winze. The retimbering of the Consolidated shaft was much impeded by the striking of a pocket of water at a point about 75 feet below the surface, during the first part of the week. This water pouring into the shaft turned the current of air downward, which greatly increased the heat and caused the delay. It has now, however, entirely drained, and the guides are now in the shaft down to the 500 level, and work on the lower section of the shaft, commencing at the 1500 station, has been commenced and is making good progress.

BELCHER.—The east drift on the 2360 level is steadily advancing toward the ore vein, and will have 60 feet or more to run to reach it. The north drift on this level, running to connect with the south drift from the Crown Point, is advancing at the rate of five feet per day, the face in very favorable ground.

ALTA.—Sinking the main shaft is being pushed steadily ahead, the bottom in good blasting ground, and the flow of water steady and strong. The north drift on the west side of the ore vein on the 1250 level is now in 310 feet, and is being pushed vigorously forward to open up that portion of the mine.

CON. VIRGINIA.—Daily yield, 350 tons of ore, which is being crushed as fast as it is extracted. The drift south from the California mine on the 1950 level has reached the north line, and is now being driven southward to connect with the joint Best & Belcher winze. This connection, when completed, will thoroughly ventilate the 1950 level of the mine. Sinking the winze in the west ore body below the 1650 level is making good progress. West crosscut from winze No. 1 on this level is still advancing, the face in good ore. A drift south has been started from the east crosscut on this level, the face of which is in excellent ore. Repairing the main south drift connecting with the Gould & Curry mine on the 1550 level is going steadily forward.

OPHIR.—A station is being cut out in the winze, on the ore vein at a depth of 100 feet below the 1900 level, for the purpose of starting a drift westward to connect with the east drift from the 2000 station. The full size of this station is in good ore, but it is more than likely that it is but a very short distance to the westward at that point to the west side of the ore vein, as the winze in its descent cut what was evidently the west wall some 50 feet above the station, and the general features of the quartz indicated an almost perpendicular position of the ore vein. The ore which is being taken from the winze below the 1900 level is being milled as fast as it is extracted, and will go far toward helping to pay the running expenses of the mine. The repairs to the main shaft above the 1465 level are being pushed steadily ahead.

SAVAGE.—The east drift on the 1640 level is now in a distance of 224 feet, the face still in solid quartz. This gives a distance already penetrated by this drift of 78 feet of quartz and ore. This shows that the ledge at that point has great width, strength and promise, having cut in its course many bunches of excellent ore, and the general features being such as to warrant its extent both above and below this level in a well-defined fissure.

WELLS-FARGO.—This mine has again started up under the able superintendence of Mr. J. H. Crossman, and is to be now developed in a manner commensurate with its real worth. The location could hardly be a better one, being on a due north and south line with the Alta, Julia and the east ledge in the Consolidated Virginia and Ophir mines. A line of heavy croppings runs through the entire length of the claim. A double compartment shaft has been sunk to a depth of 528 feet. At the depth of 60 feet below the surface a fine vein of mineral bearing quartz, assaying from \$20 to \$30 per ton, five to eight feet in width, was passed through. It is now the intention to retimber the shaft and put the machinery all in good working order, and then to open a station and

start a drift east to again cut and prospect the fine ledge passed through near the surface.

YELLOW JACKET.—The north winze on the 2200 level is down 347 feet on the slope; hot-ton in hard, dry ground. The dam on the 1730 level operates finely thus far, the water raising to the vertical height of 130 feet in the incline. This obviates the necessity and work of pumping about 60,000 gallons of water daily. The new shaft is down 1484 feet, with the bottom still in hard, tough working ground. The new pump engine and machinery is approaching completion, as also is the blacksmith shop and other outside arrangements.

SIERRA NEVADA.—The east crosscut on the 1700 level is still continued, the face in porphyry and vein matter, showing no important changes. The west drift at the 2000 station of the south winze has reached what appears to be the west wall of the vein and has been discontinued. A diamond drill will, however, be run some distance further west to make sure that the wall has been actually reached.

SILVER HILL.—Sinking the main incline is making good progress, the bottom in fair blasting ground and the water giving but little trouble. The east drift on the 900 level is being pushed vigorously forward to reach the main ledge.

BEST & BELCHER.—The south drift from the bottom of the joint winze on the 1900 level is steadily advancing, the face in very favorable quartz and vein matter.

JUSTICE.—The Pacific mill was shut down day before yesterday, and the shipment of what ore is being taken out to the Santiago mill, on the Carson river, was commenced. There is but little change in any of the ore-producing sections of the mine, there still being considerable quantities of low-grade ore in sight.

JULIA CON.—East crosscut No. 1, on the 2000 level, 100 feet south of the shaft, is being vigorously pushed forward, the face in vein matter, and is following up the course of the diamond drill recently used on that level.

OVERMAN.—Sinking the double incline winze below the 1400 level is proceeding as usual, the bottom in very favorable quartz and vein matter. The flow of water is still quite strong.

UTAH.—The south lateral drift on the 1350 level has been driven steadily ahead and is now within eight or ten feet of the south line of the mine, the face in lively vein matter. This drift will be pushed ahead until a connection is completed with the Sierra Nevada mine, which is very necessary for ventilation purposes.

GOULD & CURRY.—Sinking the main incline below the 1800 level is making steady though slow progress, on account of the great heat. The connecting drift on the 1600 level with the Savage is being repaired, in the hopes that it will assist in ventilating and cooling the lower levels of the mine.

UNION CON.—Enlarging and retimbering the north drift, connecting the 1600 level with the Sierra Nevada, is being pushed vigorously forward, in order to increase, if possible, the circulation of air through that portion of the mine.

HALE & NORCROSS.—The pumps have been kept running steadily during the week, but owing to changes at the Savage, and but the pumps of one mine being run a portion of the time, the water has been held at a distance of 20 feet below the 2100 level, without trying to make any considerable gain in reducing the flow.

MEXICAN.—The joint Union Con. east drift on the 1600 level is being steadily advanced without any change of value to record, the face being still in porphyry.

BULLION.—Sinking the main incline below the 1840 level is making the heat of progress, the bottom in good blasting ground. The east drift on the 1840 level is being steadily pushed ahead, the face in quartz and vein matter.

LADY WASHINGTON.—The face of the north drift on the 1150 level continues in fine quartz, showing bunches of excellent ore. The ore stopes opened by the Justice directly on the south line of the mine on the 1000 level are opening up handsomely, and are showing an excellent face of good ore.

CHOLLAR-COMBINATION SHAFT.—Sinking the combination Chollar-Savage-Norcross shaft has made fair progress during the week, taking into consideration the extreme hardness of the rock in the bottom a large portion of the time, and the steady flow of water, which averages about 41,000 gallons per day.

LEVATHAN.—The main drift east at the 765 level from the incline is now in about 25 feet, and is evidently nearing the vein, judging from the good stringers or feeders of quartz met with in the face of the drift.

CON. IMPERIAL.—The enlarging of the main north and south drift on the 2400 level, preparatory to crosscutting both east and west at several different points, is going vigorously forward.

CROWN POINT RAVINE.—Sinking the shaft is going steadily forward as usual. The rock at the bottom is porphyry of a medium hardness which blasts and works well.

TROJAN.—The ore stopes on the 400 and 450 levels are showing well and are yielding a considerable quantity of good ore, which is being shipped to the Vivian mill, on the Carson river, for reduction.

ELY DISTRICT.

THE ALPS.—*Pioche Record*, May 25: The drift on the 1200 level of the Mazaepa has been run west 25 feet during the week. Winze below the 1200 is in on water, with more or less ore throughout. Mine producing considerable quantities of ore from the 7th, 8th, 9th and

Total rain during the season, from July 1, 1877. 35.17 in

Protection to Levees.

[Written for the Press by W. M. RYER, M. D.]

We hold these truths to be within the observation of all persons, that earth, the deposit of rivers, when thrown up and subjected to the action of waves and currents of water does gradually or suddenly wear or wash away. That the smallest current of water, though no wider than the hand, cuts a channel through earth that has been undisturbed for ages. That larger streams with currents and waves dissolve and cut away every earthly restraint to their course.

If we go to the fields we see the ground channelled with water courses. If we go on the hillside we find them furrowed by the water of rains or springs. There is no fact in nature more clearly presented to us than this, *running water washes away any earth that may be an obstacle to its course.*

With this natural law before us as daily witnessed by all persons, it becomes a wonder why levees have been constructed without reference to it. The levees of the Sacramento river are composed of alluvium of excellent quality for the purpose; they were thrown up at an immense cost, and were expected to restrain the waves and currents of a swift running river, and this with the earth in direct contact with the water. If earth never yet resisted currents of water, why should we have expected it to do so on the Sacramento? Earth, loosely thrown up, we have believed would protect millions of property, and because it has failed to do so we despair and declare the reclamation of the best land in the State impracticable!

Stopping Short of Success.

We have demanded success without having fulfilled the requirements which command success; on the other hand, with ages of experience before us, we have refused to learn, and have stopped our labors omitting that which would have ensured success. Levees of proper height, with sufficient base, and composed of as good material as levees which have stood the action of the waves of the sea or the currents of rivers for centuries in Europe, have been constructed on the Sacramento river. When the river was two feet higher than the bank these levees commenced to waste and cut away, and the owners placed thousands of sacks of earth to protect them, thus attempting to do under unfavorable circumstances that which could have been done by a different and more economical way at a time when there was no water present. The immense expense and effort made to protect the levees during the existence of high water, seems to show that the protection of levees is believed a necessity even by those who would not foresee when constructing their levees, that the bare earth subjected to a current will surely be washed away.

Good Material for Levees.

The levees of the Sacramento have been constructed of alluvium of a weighty and cohesive nature; and they have been built upon foundations not liable to settle; and on a river whose banks are exceptionally permanent. The deltas of the rivers of the continent in no case present more favorable conditions for reclamation than does the Sacramento; and yet these sustain levees that neither the freshets of rivers or the storms of the sea do wash away. Now why should disaster visit one, and success the other? The answer is brief and simple. The Sacramento levees were not covered or protected in any place; but all the levees on the continent are covered and protected as high as waves or currents can come.

What May be used in Protecting Levees.

Upon the manner of protecting levees we do not profess to be expert, yet the importance of the subject demands all the space which the *RURAL PRESS* can accord to us, and we give our observations as follows: The question of expense is in California a prime consideration, we therefore dismiss stone and iron as material not available. Redwood timber is endurable, but in a sloping levee, the carpentering would have to be done most perfectly; and even then, this covering would be liable to get out of repair when most needed. The buoyancy of timber together with the action of waves, makes it liable to break the attachments and float away. This was manifest last winter from the loosening effects of waves and the lifting power of water, raising whole lines of fences and floating them away. By far the cheapest and most used material for protecting levees on the lowlands of Europe, is the willow, pine and other brush too small for fire wood, and of but little use except for this purpose. For the purposes of protecting banks and levees there is no material in such general use as the small twigs of willow and other trees which grow upon the banks of streams. These the Dutchmen carefully save and transport in boats to the levees they wish to protect; and these the Sacramento river levee builders have always burned, and then have expended thousands upon building levees, which, unprotected, were as certain to wash away as that water will wash uncovered earth.

In constructing a levee let it never be forgotten that the protecting properties of a levee are only in proportion to the weakest part of the

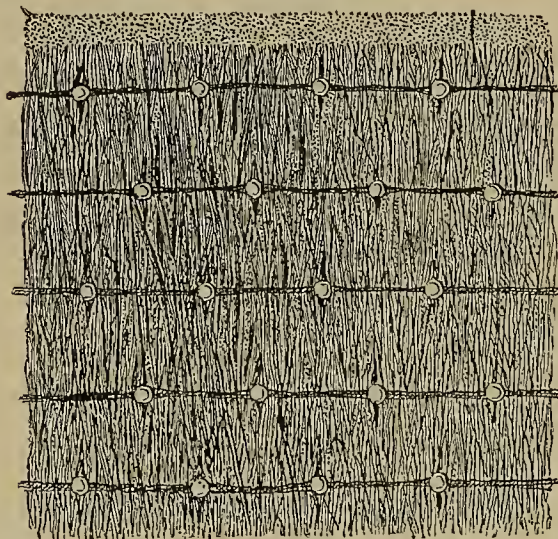
levee; we would therefore impress the necessity of the most careful attention to all the details, and the most thorough watching, that every part is well done; for where water is your adversary, there can be no compromise. The Hollander takes twigs of willow, sycamore, pine, alder, etc. These are often brought down the Rhine in boats, even from 50 to 100 miles. These twigs, from one-quarter to one inch in diameter, are sufficiently exposed and dried, so they will not grow, for no trees should grow upon a levee exposed to currents; although growing trees are desirable outside of a levee and on the banks as a protection from waves and currents.

How the Small Branches of Trees are Used.

Care is taken that nothing much thicker than one inch is used, and these are carefully laid, each twig parallel and as close to the other as possible, the lengthway of every twig extending and forming a dense mat, with others similarly placed from the high-water line to the base of the levee. Every twig is most carefully placed on the outside of the levee, until the mat, or

ramento has thus been protected. It is quite certain that five men can thatch and firmly cover with twigs as much levee as 100 men can build; such being the case, how strange that any should thus neglect to protect that which they build. We Americans build houses of brick, put on iron doors, and go to vast expense in making houses fire-proof, but we invariably make every partition in the house of wood and leave them hollow, and then wonder why our fire-proof houses burn. We build levees, leave them exposed to the direct action of waves and currents, and then declare that levees cannot be built that will stand the currents of the Sacramento. The banks of the Sacramento in no place washed away last winter sufficient to cause a break in any levee; therefore the fault was not in the foundation. On the other hand the levees commenced cutting away when the water was but two feet on their base, and continued to cut as the water became higher, until the breaks occurred.

Land in Holland worth \$400 and more per acre, and no better than our Sacramento over-



FACE OF LEVEE, SHOWING PEGS AND WIRE LACINGS.

thatch, is from six to nine inches in thickness. Each twig is transverse to the axis of the levee and none run on a line with the axis.

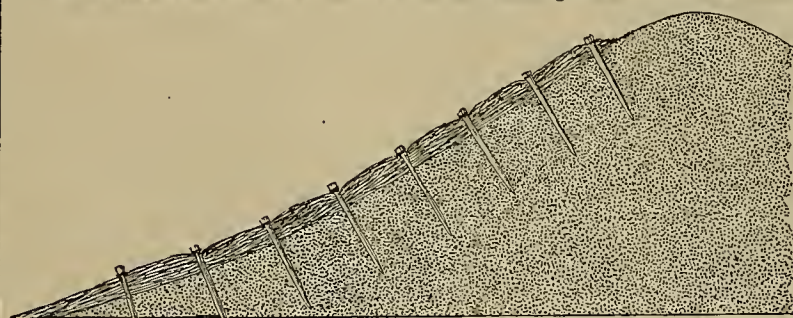
When the thatching is thus laid on the outside of the levee, the workmen proceed to secure it. This they do with pegs, two or three feet long, with a diameter of two or three inches. These pegs are driven down, leaving enough of the top exposed for the workmen to twist a wire or willow over them. When this is done, the pegs are driven down, thus compacting the mass of thatching and pressing it tightly on the levee.

Every peg is placed about 18 inches from the other, and the wire or willow, extending to its neighbors, holds the thatch so firmly that currents or waves cannot displace them, and so long as this thatch holds together, no levee can wash away.

When the levee is thus thatched six or more

flowed land, is there protected from the sea, whose surface is 14 feet above the land, and whose waves go many feet higher. Day and night the sea breaks its force upon these levees and centuries pass away, but the levees continue as barriers to the water. These levees are constructed of earth no firmer than the earth on the banks of the Sacramento. Twigs of willow and other trees are made effectual in protecting the levees of that country, why should they not be in this?

The engraving on this page will give the reader an idea of the practical construction of the style of levee protection which is practiced in Holland, and proposed for use in this State. One cut shows a section of the levee with the pegs reaching through the thatch into the earth of the levee. The other cut shows a view of the face of the thatch with the ends of the pegs and the connecting wires. The whole construc-



SECTION OF LEVEE, SHOWING METHOD OF PEGGING THE THATCH.

inches, properly pegged and wired, then six inches of earth may be thrown upon it to protect the thatch from the tramp of cattle and fire. A levee thus protected will endure four years. Then it may be removed, provided a proper grass may not have grown upon it, sufficient to protect it from currents or waves.

Every tree, hush and such grasses as alfalfa (with its single root) growing upon a levee, cause a whirl of water around them during a freshet, which rapidly cuts down a levee.

The outside of a levee should be at all times open to inspection, and, therefore, nothing but grasses with matted roots should be permitted to grow upon it.

No greater mistake can be made than the seeding of alfalfa and the allowing of weeds to grow upon the levee, for these harbor and feed animals which burrow in the levee, and when the current is rapid, the water whirled around the alfalfa and weeds and cuts away the earth.

Simple but Effectual Protection.

With a manner of protection so simple, and which ages of experience has shown to be effectual (for two-thirds of the levees of the Continent have been thus protected for centuries), is it not strange that not one levee on the Sac-

Mining about Clifton.

A correspondent of the *Tucson Star* thus describes the various branches of mining in progress about Clifton, the principal mining center of southeastern Arizona.

The Longfellow copper mining company's smelter is situated in the triangle between two steep mountains, on the west bank of the San Francisco river, and nine miles distant from the mine. These works (from Patterson, New Jersey), cost, it is estimated, \$100,000, a considerable part of which sum was "wasted," as the Superintendent said. The works turn out 5,000 lbs. copper in bars of 250 lbs. average weight. This company employ some 200 men at the mine and works, principally Mexicans, with a considerable number of freighters and coal-burners, in the mountain adjacent. Average of wages paid here, \$2 a day, in L. C. M. Co.'s "checks" or promissory notes, printed on stout red cloth, and payable entirely in merchandise at the Company's store in Clifton, or if a considerable amount, half in greenbacks and half merchandise, at M. Lisinsky's store in Silver City, N. M., 120 miles distant. The copper thus extracted is shipped via Silver City to El Moro, Colorado, and thence to Baltimore, Md., for seven cents a pound, at which market the bars are worth at present rates, 18 cents per pound. Placer mines are being worked around and about Clifton on the river San Francisco. From some of them 50 cents to the pan has been taken out, but \$2.50 a day is the average, which about pays a man's way in that remote corner of Arizona. The gold thus extracted goes \$17 to the ounce. Above Clifton there are several American mining in hatea and wheelbarrow diggings. From the latter \$5 per day have been taken. The Bentz brothers are preparing to ground-sluice there, and Pinkard & Johnston are about to commence hydraulicing; they expect to find several old channels of the river in the present bank. Others are turning over the gravel benches in search of the glittering treasure. There are three signs on Longfellow street, one reads "Postoffice;" the second, "Strangers are not admitted to eat with the workmen;" third, "Attention! this is not a hotel, it is private." A neat store, well filled, is the rallying point and center of commerce, where everything is kept, from a bottle of whisky to a paper of needles. Butchering morn is the social event in Clifton, and as it happens only at daybreak every second morning, considerable scuffling takes place for beef and sheep meat at 12½ cents per pound. There is a fine opportunity at Clifton for a baker, with 100 men to supply who do not care to cook for themselves and who deplore the mess system; a number of heads of sheep or beef cattle could also be kept near town on the side grasses of the vicinity, and a fair profit made from butchering them at Clifton.

Giant Powder in a Cook Stove.

Giant powder cartridges are articles that ought to be handled with considerable caution. This is a self-evident proposition, and has been demonstrated by numerous examples. The latest affirmative test on this subject is furnished by Billy Watson, whose cabin did adorn the slope of the Newark Valley range, but at the present time is scattered over considerable territory. Billy has been absent from his humble abode for some weeks on a prospecting trip out to Muncey creek and vicinity, and before his departure placed half a dozen of the rock-rending explosives in his stove oven, in order to secure them from being spoiled by the dampness during his absence. When he returned to the domicile he was hungry, and without thinking of the contents of his stove, he built up a roaring fire, sliced off some bacon and started to put on the tea kettle. That reminded him that there was no water in the house, and seizing the pail he journeyed to the spring about 100 yards distant. It is lucky he did, for the trip probably saved his life, and gave him a chance to relate to us the inevitable sequence to that incident. We think that Billy exaggerates when he likens the explosion to an earthquake, and his statement, that that there was nothing left of his late residence but a hole in the ground is to be received *cum grano salis*. No doubt things were mixed, shook up and scattered, but his story about there not being timber enough left to furnish material for a tooth-pick, and that the stove lids lit in Ruby valley, is absurd. However, William saved the water pail, and is of the opinion that haked giant powder cartridges are a species of viands liable to raise things more effectually than a case of yeast powders. — *Evreka Sentinel*.

LEAD.—The *London Mining World* is of the opinion that the price of lead has reached its lowest point, and that the tendency will be upward in the future. To support its theory, the *World* reviews the unsettled condition of business during the last three or four years in England and America, and claims that the mines of Spain and Germany cannot be worked at a profit at the present price of the metal, and that the home consumption in this country will absorb the whole of our product. We certainly hope the predictions of the *World* may prove true, as the present price of lead is a serious impediment to the successful operation of our low-grade mines, and an advance in the price would have a tendency to promote production, and have a healthy influence on our mining industry.

tion is seen to be very simple and it has been proved to be very effective.

A GOON RECORD.—The Central City (Colorado), *Register* discourses as follows: Although one of the smallest counties, Gilpin has furnished half the yield of the State, and is increasing its production yearly. The mineral belt here is about 10 miles wide, extending into neighboring counties. The production in gold and silver, up to the present time, has been nearly \$40,000,000. Eighteen quartz mills are at present at work, turning out about \$5,000 in gold daily. In 1877 there were less than 1,500 men engaged in mining, milling and kindred pursuits, and their production amounted to \$2,300,000, or over \$1,500 for every man engaged. The prosperity has really just commenced. It is as enduring as the hills, and with the excellent facilities now afforded for transportation by the Colorado Central railway, must soon increase many fold. Mining has developed from chance, and guess-work into a grand science. The ore channels are as numerous as the veins on our hands. They were never richer, never in such trim to yield the royal metals as to-day.

Mining in Utah.

Fully 25 millions of home and foreign capital is invested in our mines, all of which when judiciously expended and honestly and economically managed, is paying a fair, and in many cases, a liberal profit. And the developments so far made show that there is room for the profitable use of four times this amount. The varied and inexhaustible wealth contained in these mountains, has so far hardly been touched. In Beaver county, the largest body of argentiferous ore in the known world has been partially uncovered, and in Washington county, so far as investigation has been carried, an amount of treasure exists which it would be difficult to over-estimate. The lack of transportation facilities in that remote region sadly retards progress, but it is not in the nature of the American people to stand at difficulties; and it is a safe thing to say that now it is shown sufficient business exists to justify the building of a railroad (to the Beaver mineral region, at least), the road will soon be forthcoming.

In that portion of the Territory, too, iron mines of really fabulous extent are in plain sight; while coal in vast fields pervade the entire Territory. It requires no great stretch of faith to see these resources, at no great distance of time, utilized, and Utah become foremost in her silver production and the equal of Pennsylvania in her iron industry. Only eight years have elapsed since capital and enterprise were first applied to the work of mining in this Territory, and perhaps not more than half that time since the work was legitimately embarked in, and the same skill, economy and correct business management applied which are necessary to success in other undertakings. Such a beginning augurs well for our future progress; and now that the Mormon scare is pretty effectually laid, and a fair field is open to all who wish to join in our useful labors, we look to see the work of development carried forward at an increased rate, and the annual output of our mines correspondingly extended. —*Salt Lake Tribune.*

Black Hills.

The total assessed valuation of this county made one year ago aggregated something over \$300,000. Of this year's assessed valuation 57 individuals and firms alone aggregate the handsome sum of upwards of \$600,000, or nearly twice the total valuation of last year. It is only within the past two years since the region around the Black Hills was settled, after much difficulty, and with considerable loss of life. Within that time what a great transformation has been effected! Deadwood is now a city containing between 4,000 and 5,000 population, with three solid banking institutions, two churches, a public school, two theaters, an evening and morning newspaper, and wholesale and retail stores of all classes equal to any that can be found in any city in the country of three times the population of Deadwood. There are now over 700 stamps in operation, and it is not unreasonable to expect that during the season 2,000 additional stamps will be up. Wealthy capitalists have come in and purchased many mines at large figures, and are now building extensive mills. Gold paying ore is being found everywhere, and new camps are being worked and discovered daily. The "helt" theory is exploded, and the gold-bearing territory will most probably prove to extend within the two branches of the Cheyenne river, an area of 1,500 square miles, sufficient to make the gold supply permanent. Our climate is delightful in summer and mild in winter, with the exception of occasional snow-storms. Our country produces good crops, both roots and cereals, in abundance, and we raised sufficient potatoes last year for our own consumption. Our grazing lands are fertile, and in another year all the necessities of life will be as cheap here as in Eastern cities. —*Lawrence Co. Times, May 11th.*

COLD AS ICE AND PURE AS CRYSTAL.—The eastern border of Independence valley is a lofty, ragged and jagged range of mountains, mainly composed of dolomite and quartzite rocks. The range is deeply indented by many dark, gloomy canyons and gorges, from each of which flows into the open valley streams of the purest spring water. At the base of the mountain, at a point nine miles east of Tuscarora, one of those springs, having a volume of about 1,500 miners' inches of water, comes roaring out, a new-horn river, as clear as glass and as cold as ice. This spring forms one of the sources of the Owyhee and in the early summer months is a favorite resort of trout, salmon trout and Columbia river salmon. At a point in the valley 15 miles to the northeast of Tuscarora there are several of the most remarkable hot springs in the State. The water of these springs, which pours out in large volume, is boiling hot and comes seething and hissing from the depths with a noise like buried thunder. Perhaps at some time in the near future an enterprising citizen may utilize these roaring cauldrons for either the purposes of irrigation or for bathing the dusty denizens of Tuscarora. —*Times-Review.*

THE *Chico Enterprise* says that the business of making lumber has fairly commenced there for the season. The Sierra Plume and Lumber Company make 40,000,000 feet of lumber annually, and has 260 miles of flumes, 200 miles of telegraph line and employ 500 hands. Chico has entered into an experiment of competing with Michigan for the Australian lumber trade.

USEFUL INFORMATION.

New Method of Protection from Rusting.

According to the *Iron Age* a process, depending like that of Prof. Barff on the formation of an unalterable magnetic oxide, for the protection of iron against oxidation, has been patented in England by Mr. George Bower, of St. Neot's. The means by which he accomplishes the desired end is, however, in every way different from that used by Prof. Barff, and which we described some months ago. It is well known to every tyro in chemistry that if we pass steam over red-hot iron the steam is decomposed, hydrogen being set free, while the oxygen goes to the iron to form the stable magnetic oxide (Fe_3O_4). On this reaction depends the process of Prof. Barff, who places the articles in a heated chamber, and then passes in superheated steam, for a time dependent, of course, on the thickness of the film required. Mr. Bower has, however, discovered a process that will most efficiently coat the iron, and at the same time simplifies the whole of the working details. The agent he employs is the oxygen of the atmosphere. The articles are placed in a chamber constructed of fire-brick or iron, and fitted with inlet and outlet pipes; air is passed in and the chamber closed as completely as possible. The temperature is then raised to the requisite degree, which varies with the nature of the articles, and which ranges from a dull to a bright red heat. At the end of every hour the inlet and outlet pipes are opened and the air renewed, the pipes being again closed. This process continues until the required thickness of oxide is formed, which will, of course, depend upon the purpose for which the articles are designed. The cost of thus protecting iron depends simply on the amount of fuel used, with the labor and wear and tear of apparatus involved; so that the process has, it is claimed, the advantage of being the cheapest as well as the most effective yet brought before the public. The coating has been severely tested, both as to hardness, homogeneity and capability of withstanding all the ordinary oxidizing influences likely to be brought to bear on it, and has not been found wanting. It is found that the process, as at present carried on, answers best with cast iron; but with a cheap and easily applied modification, the details of which are not yet made public, it is found to answer equally well for all other descriptions of the metal.

NOTES ON THE TELEPHONE.—The telephone has been successfully adopted, says the *Railroad Age*, by the Central Pacific railroad, as a means of communicating between stations over the mountain division. Boxes are to be placed a few miles apart and the track walkers are required to report by means of them on each round. For use at stations where business will not justify the employment of a telegraph operator there is no doubt that the telephone will prove a valuable adjunct, and we expect to hear of its common adoption. The *Detroit Free Press* gives an account of the working of the telephone during the recent burning out of its building. The telephone in the editorial rooms communicated with the residence of the managing editor, a mile and a half away. When the fire attacked the editorial rooms, the bell at the residence began to ring violently. As the fire increased in intensity the ringing of the bell became more impetuous, pealing in gusts as the fire seemed to surge around the companion bell in the burning building. It was an embodiment of Poe's lines on "The Bells," where the rising and the quelling of the fire could be calculated by the rising and the falling of the anger of the bells. At last the clamor of the telephone bell became unbearable to those in the room and the bell was muffled with cotton, which partly stopped the alarm. But here the strangest part of the telephone's action comes in. From the speaking tube came the roar of the fire, and it would seem that the swish of the water from the engine, and the pouring of the floods from the roof could be plainly heard. The crackling of the burning timbers, and at last the crash of floors and falling partitions came, and every sound of the conflagration in all its inflections was faithfully reproduced. The sudden stoppage of all sound showed that communication was broken and the voice of the wonderful instrument stilled by the scorching flames.

MANUFACTURE OF CHLORIDE OF LIME.—A new process for the expeditious manufacture of dry chloride of lime has been invented by Mr. E. Malet, of Paris, which consists in the employment of mechanical means for stirring, agitating, or mixing the powdered lime and the chloride of lime as fast as it is formed, in such a manner as to expose all the molecules of these substances in succession to the continuous action of the gaseous chlorine, which is introduced under favorable conditions for combining with the lime, and is rapidly absorbed by the latter. In order to insure regularity, it has been found necessary to couple at least two apparatus together, so as to admit of the chlorine being directed into either as required. The process is very rapid, and is carried out with great facility, and without any waste of chlorine. The progress of the operation may be constantly watched by persons near the apparatus, which emits no injurious odors. The apparatus is cheap in construction, and occupies but little

space. The manufacture may be regulated at will, as examples of absolute homogeneity (as may be ascertained by testing) may be taken at any time during the operation. As the chloride of lime manufactured in this manner is homogeneous in every part it is not liable to become decomposed, as is the case with chlorides manufactured in layers, more or less deep, and in a state of rest, and a source of considerable loss is thereby avoided in the manufacture of this product, which is liable to deterioration from the influence of climate and other influences resulting from its composition.

TESTING LUBRICATORS FOR ACIDS.—A new and simple method of testing grease and oil for acids is recommended by Dr. Weiderhold to those who use either grease or oil as lubricators for machinery. Either cuprous oxide or copper-smith's scale is put into a small test tube, which is filled with the oil to be examined. If the latter contains no fatty or resinous acids there is no change in its color, but if there is any the oil is colored, becoming light green in its lower portion within a short time, if the amount is small, the intensity of the color varying with the amount of the acid. Oil containing resinous acids is turned blue. These reactions appear within 10 to 20 minutes at an ordinary temperature. They are accelerated, however, by the application of heat. This method is far superior to most of those proposed, as it is very readily and easily employed. Dr. Weiderhold states that the action is so striking that it cannot be mistaken by any one, even though the experiment were made for the first time. The coloring of the oil is probably due to the fact that the fatty and resinous acids decompose the cuprous oxide, metallic copper and cupric oxide being formed. The latter enters into combination with the acids and produces salts which, dissolving in the oil, give it a green or greenish-blue color.

THE ENJOYMENT OF LABOR.—Ruskin never said a truer thing than this: "If you want knowledge you must toil for it; if food, you must toil for it; and if pleasure, you must toil for it." Toil is the law. Pleasure comes through toil, and not by self-indulgence and indolence. When one gets to love work his life is a happy one. Said a poor man in Brooklyn the other day, with a family of 11 to provide for, "If I were worth a million dollars I should not wish to do much different than I do now every day, working hour after hour. I love it a thousand times better than to rest." He has for nearly half a century been surrounded by workers and has caught the spirit of industry. He loves his work better than his food and sleep, often begrudging the time required by each. He is happy who has conquered laziness, once and forever!

GOOD HEALTH.

The Philosophy of Hot Bread.

A correspondent sends the *Journal of Chemistry* the following query: "Physicians often recommend for sick people oatmeal or graham pudding, made by stirring the meal into water and boiling a few minutes, as one of the first things to be eaten when the stomach will not bear hearty food. Why is the meal thus prepared any more easily digested than new bread or hot muffins, which are considered unhealthy? Is not the same chemical change necessary in the one as the other, which can only take place by standing for several hours after cooking?"

The two cases are by no means similar. The oatmeal or graham flour is made digestible by boiling, the starch granules being ruptured, so that their contents are more easily acted upon by the digestive fluids. In the making and baking of bread the same change is accomplished. The difference between hot new bread and that which is older is essentially the same as between "heavy" and "light" bread. It is its "lightness" or porosity which gives to bread its ready digestibility. When new, it is softer, from the steam of the water it contains; and this makes it difficult of mastication and liable to form a close and cloggy mass, which, on passing into the stomach, is less easily penetrated and acted upon by the gastric juice. By cooling and drying it becomes firmer and more friable, so that it is more thoroughly mixed with the saliva in the mouth, and goes into the stomach in better condition for the process to which it is to be subjected there.

If the bread is hot enough to melt the butter eaten with it, this makes the matter worse. The melted grease fills up the pores of the bread, and interferes with the action of the saliva and gastric juice. The fatty matters in pastry are objectionable for the same reason, and also on account of the chemical changes which they undergo in the oven.

Bread becomes more digestible by toasting, chiefly because it is made drier and firmer—that is, if the toasting is properly done. The slice should be rendered crisp throughout its entire thickness. If it be merely scorched on the surface, as often happens when the slices are thick and Biddy is stupid or in a hurry, the interior is merely softened and made like new bread, and consequently less digestible.

What English people call "bread jelly" is a light and nourishing article for weak stomachs, in some cases preferable to the oatmeal or wheat porridge. It is made by steeping stale bread in

boiling water, and passing it through a fine sieve while still hot. It may be eaten alone, or after being mixed and boiled with milk.

How to Sit.—*Hall's Journal* persists in robbing us of our comfort in this style: All consumptive people and all afflicted with spinal deformities sit habitually crooked, in one or more curves of the body. There was a time in all these when the body had its natural erectness, when there was the first departure on the road to death. The make of our chairs, especially that great barbarism, the unwieldy and disease-engendering rocking chair, favors these diseases, and undoubtedly, in some instances, leads to bodily habits which originate the ailments just named, to say nothing of piles, fistula and the like. The painful or sore feeling which many are troubled with incessantly for years, at the extremity of the backbone, is the result of sitting in such a position that it rests upon the seat of the chair, at a point several inches forward of the chair back. A physiological chair, one which shall promote the health and preserve the human form erect and manly, as our Maker made it, should have the back straight, at right angles with the seat, the seat itself not being over eight inches deep. A chair of this kind will do more towards correcting the lounging habits of our youth than multitudes of parental lectures, for then if they are seated at all they must sit erect, otherwise there is no seat-hold.

How to Eat Oatmeal.—Oatmeal, cracked wheat, and similar hoiled breakfast dishes often become more or less indigestible, says the *Journal of Chemistry*, from being "hoiled" in the usual Yankee style. They are soft and "go down" easily, and are shoveled or spooned into the stomach, with no delay in the mouth en route. They need mastication as really as beefsteak does—not to save one from choking (which many people seem to suppose is the sole reason for chewing), but to mix them thoroughly with saliva, which is a digestive agent and not a mere lubricant to expedite the passage of dry food down the esophagus. A friend of ours was lately complaining that oatmeal did not agree with him, and we found on inquiry that he was in the habit of eating it in this hurried way, without insalivation. He was much surprised when told that he ought to "chew" it, or at least to detain it for a moment in the mouth before swallowing it; but after a brief trial he admitted that he had no more trouble in digesting it. If the oatmeal or wheat is not thoroughly cooked it is all the more important that it should be masticated, as the half-softened grains offer considerable resistance to the digestive fluids.

DEATH RATES IN CITIES.—The *Sanitarian* for May furnishes some interesting statistics of the death rates in different cities of the Union during the month of March last. New York exhibits the largest ratio of any northern city, being 25.69 per 1,000 inhabitants. This, however, is far exceeded by Charleston, S. C., where the ratio is 32.89. As a rule, the southern cities show a larger death-rate than northern ones. In New Orleans it is 24.5; in Washington, 23.55; in Nashville, 22.21; in Mobile, 24.11. St. Louis, however, shows one of the lowest rates in the table, viz., 9.39, while that of Baltimore is only 18.26. Of northern cities, Boston has a death-rate of 20.38, New Haven, 18.44; Syracuse, 18.25; Brooklyn, 18.19; Providence, 18.06; and San Francisco, 17.25; while many others are considerably below even these figures. The lowest rate in the list is that of Yonkers, in New York, where the mortality for the month was only 8.27 per 1,000.

KEEP THE HEAD COOL.—An interesting paper was read at a recent meeting of the Royal Society on "Experimental Researches on the Temperature of the Head," in which the writer, Dr. Lombard, showed that mental activity will at once raise the temperature of the head, and that merely to excite the attention has the same effect in a less degree. This is a curious result, as appearing to show that anything of the nature of volition involves a waste of nerve tissue which is not involved in involuntary perception and observation. There is no difference, we believe, between the temperature of the sleeping body and that of the waking body, or between that of the waking body and of the head, so long as no act of effort is involved. But if even the least intellectual effort raises the temperature of the head above that which it reaches in amused and idle observation, it would seem to show that there is a waste involved in volition which belongs to no so-called "automatic" action of the mind. And that is itself a fact of no slight significance.

MRS. PARTINGTON ON DISEASES.—Diseases are very various—very. The doctor tells me that poor old Mrs. Hazo has got two huckles upon her lungs! It's dreadful to think of 'tis really. The diseases is so various! One day we hear of people's dying of "hermitage of the lungs," another of "brown-creatures;" here they tell us of the "elementary canal" being out of order and there about the "tear of the throat;" here we hear of the "newrology in the head" and there of an "embargo" in the back. On one side of us we hear of a man getting killed by getting a piece of beef in his "sarcofagus," and there another kills himself by "desilvering his jocular vein." Things change so that I don't know how to subscribe for any thing now-a-days. New names and "rostrums" take the place of the old and I might as well throw my old yerb hag away.

MINING AND SCIENTIFIC PRESS

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NEW ADVERTISEMENTS.

Hoe & Co.'s Patent Mill, Shop and Engine Saw, H. L. Tatum & Co., S. F.; Machinery, Berry & Place, S. F.

The Week.

The weather the past week has been propitious to all our leading industries. The outlook for the mines, which continue to yield bountifully, is exceptionally good. An increasing demand for labor has tended to further meliorate the working masses and placate the malcontents; never here of the communistic or other more dangerous kind. Commencement at the State University passed off on Wednesday last in a manner creditable to the faculty and graduating class, and gratifying to the friends and patrons of the institution. The provisions of the proposed new Constitution are being discussed with a freedom and breadth indicative of radical changes in the present instrument. The first step towards settling the great problems of irrigation, tule land reclamation and the disposition of the mining debris, was taken during the week, the State Engineer having entered upon this work, for which the Legislature, at its last session, appropriated the sum of \$100,000. Salmon fishing, retarded by the lateness of the run, is now active and the canneries are likely to do a good business before the season closes.

It is believed that Chicago can save \$200,000 per annum over the present cost of gas by lighting the city with electric lights, and the proposition is now being thoughtfully considered by the business men of that city.

PROF. MARTIN and C. A. Mahoney, an *Alta* reporter, who made a balloon ascent from Woodward's Gardens, last Sunday, were badly bruised while trying to land, owing to the violence of the wind.

THE result of a test case, tried at Philadelphia, foreshadows that Allegheny county must pay for all the goods destroyed in the Pittsburgh labor riots.

Moving the Mining Debris in the Slate Creek Basin.

From what is being said by our mountain contemporaries on the subject, we infer that increased attention is being paid to the reworking of the hydraulic tailings which have been deposited in great quantities along the beds of some of the interior gulches and rivers. We have heretofore described at some length the character of these deposits, as we find them at several places in Placer and Nevada counties, making mention of the efforts about to be made there to utilize the same. At a number of points in the mining districts further north this auriferous debris has made extensive lodgment; notably so along Slate creek, Sierra county, where also a grand project has been inaugurated for moving and reworking these accumulations. Skirting this creek, which runs through a broad basin-like valley, are several of the old channels known as Pliocene or "Dead Rivers," being gold-bearing streams that in a former age have been so filled up with alluvial drift, volcanic ash and lava flows that nearly all surface indications of their existence have been obliterated. Slate creek, which at times is quite a large stream, takes its rise in the deep canyons and spurs about Pilot peak, Plumas county, and running southwest discharges into the North Fork of the Yuba, receiving in its course the detritus from Whiskey Diggings, Gibsonville, Gardner's Point, Howland Flat, St. Louis, Pine Grove and several other important hydraulic camps situated along the main stream or its confluent. Gold washing commenced in the Slate Creek basin at an early day and has been steadily and successfully pursued there ever since, the mines here having paid as well as in any other part of the State. Their production has, in fact, been notably large, the quantity of gold dust annually sent from La Porte, shipping point for this section of country, having formerly been estimated by the ton. About the richness of the original stock of gravel in this neighborhood there can, indeed, be no question; it being equally well known that a large percentage of the gold still remains in the tailings, the more valuable portions of which, being too heavy to be easily floated away, have lodged along the bed of the stream, filling the upper section thereof to a great depth.

At a point on Slate creek about one-fourth of a mile below the mouth of Rahbit creek, one of its tributaries, there occurs a considerable fall, caused by a heavy reef of hard rock crossing its bed. By cutting away this rock for a short distance an open channel would be secured having sufficient descent to run off the entire body of tailings deposited along the stream above. Once past this barrier these tailings would not again make lodgment, the fall in Slate creek below being ample to carry them on and empty them into the Yuba.

The quantity of this debris now resting in the bed of Slate creek can be estimated from the fact that it has filled up the channel to an average depth of 40 feet and a width varying from 150 to 800 feet for a linear distance of 15 miles, this being apart from the large quantities deposited in the numerous branches of the main stream. Of this material the Alturas company, owning the principal outlet and already organized for active operations, have title to 3½ miles, covering an area of 320 acres of the heaviest and richest of these deposits, besides 600 feet extending up Spanish Flat ravine. This company also own two ditches, have a sawmill for cutting all needed lumber, and a franchise for the water flowing in Slate creek. They have done much work upon this property in the way of cutting down bedrock, tunneling through rocky points to increase the fall by shortening the channel, in the hope that they would by these means be able to move the mass of gravel and continue washing, without incurring the greater expense of excavating a passage through the rocky barrier that constitutes what is known as the falls.

Having, through recourse to these cheaper expedients been unable to prosecute operations on a large and uninterrupted scale, this company have determined to adopt the more effectual plan of cutting through the reef near the lower end of their claim and thereby secure ample grade to run off the gravel from their own track and the entire basin above. As this work is not at all formidable, either as regards the length of time or the amount of money required for its execution, the company ought to be able to readily command all the pecuniary aid needed and push it to an early completion. This scheme constitutes the third or fourth of a similar kind lately set on foot in the State, and all of which if properly managed ought to lead to good financial results. Of the others, one to operate on Shirlair canyon and two along Bear river and its branches, we have made some mention during the past few months, taking occasion then to state that, while these tailing deposits are very extensive in certain parts of our California gold fields, only in a few instances, like those here alluded to, do they exist under conditions favorable to their being hauled with profit, the great trouble being want of sufficient fall or outlet to move them economically and effectively. Where this can be had without too great cost the reworking of these auriferous slums opens a very alluring though limited field for the investment of capital.

Air Compression Tunnel and Mining Tube.

Among the topics of interest at the present time spoken of in the city in mining coteries is the issuance by Mr. H. R. Leonard, the mining engineer and architect, of a statement respecting his invention of a *modus operandi* for effectively reaching the bedrock of rivers and tunneling with safety beneath the waters. Old miners well remember the success that rewarded the efforts of many enterprising men who sought the golden ore over 20 years ago in the beds of several of the chief rivers of the State, and how not a few got suddenly wealthy in a day. Difficulties, however, then insurmountable, and so frequently met with, brought in their train so much of discouragement that river mining, in course of time, became almost entirely abandoned. Now and again new efforts were made by men of energy, means and good pluck to succeed in rendering bedrock mining a tangible and reliable enterprise of the country; but as far as we have ever heard no one has been fully satisfied with the results financially. Now we hope that something has at length been thought of which will meet the requirements of this class of labor, and thereby lead to the "better times" which once made California the envy of the world.

Mr. Leonard's brochure is clearly written, avoids puzzling technicalities, and is just such a statement as the least learned miner, as well as the wealthy capitalist, can readily understand. We regret being unable to give it as much space in our columns as would be of interest, but some of it we quote for the benefit of our readers who may be unable to obtain the entire pamphlet:

"It is not the wish of the inventor to convey the idea that the bedrocks of all the rivers in California are covered with gold in as great abundance as is here quoted of portions of bedrock that have been worked on the Yuba; he simply wishes to state that in numerous cases within his own knowledge, and in very many cases of which he has learned from the experience of others, large quantities of gold have been gathered from the bottoms of our rivers, and he now provides a means for protecting the miner and enabling him to obtain all the gold that is on the bedrock where he works. It is believed, however, by the inventor, that his air compression tunnel and mining tube will afford the means of practically solving this great problem, and that tunneling under the bed of a river will be made comparatively easy and entirely safe.

"A general description of the apparatus and its application to tunneling under water may be thus stated: A tube is made of iron, of suitable diameter, in sections of convenient lengths, and bolted together and made air and water tight. This tube is driven through the sand and gravel to the bedrock by pneumatic force. Where its sinking is retarded by rocks, these can easily be removed by blasting in the ordinary way of sinking shafts. The tube, when completed, is supplied with proper air locks at the top and bottom. Those at the bottom of the tube are four in number, each of three chambers, and each of these provided with doors for ingress and egress as required. As many as 40 men can be worked on one claim with perfect freedom of action. The tunneling over the bedrock is performed like ordinary tunneling, and the water entering the tunnel from seepage or otherwise is driven out by atmospheric pressure by air compressors, operated by steam power, and is kept out by the same atmospheric pressure, under which the miners work. All proper appliances are provided for hoisting by steam in the usual way. The tube and chambers are well provided with safety valves, gates, etc., so that the workmen can, at their own convenience, protect themselves from over-pressure of air.

"The great advantages claimed by this means of operation are, that the miners are able to tunnel over the bedrock and pick and scrape up the whole surface, and can see the work before them and save all the gold within the claim. By the use of this apparatus the miner can work all the year round—being in no way affected by the high water."

So fully confident is Mr. Leonard of the successful operation of his invention that he announces himself ready to put up his machinery on any claim and wait for his compensation till it is a demonstrated success. He adds to his own statement a handsome endorsement by B. S. Alexander, Col. U. S. Engineers and Brevet Major General U. S. Army stationed on the Pacific, and from what we hear, the inventor has enough of friends around him to incorporate, whenever he is ready, a "mining tube and air compression tunnel company," and to manufacture to any extent the entire apparatus.

THE HOE CHISEL TOOTH SAW.—We have been shown letters from sawyers and owners of various mills, which leave no doubt that the improvements in the Hoe chisel tooth saw, made under the supervision of H. L. Tatum & Co., agents in this city, are considered a decided success. Messrs. Hanson, Ackerson & Co. have recently ordered 32 of these saws, ranging from 1½ to 60 inches in diameter, for their Tacoma, Washington Territory, mill.

In three days a man panned out of the black sand on the Santa Cruz beach, \$23 in gold. JOURNAL

Notices of Recent Patents.

Among the Patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

SELF-TAPPING CAN FUNNEL.—A. W. P. Ladd, S. F. This device, which the inventor calls a self-tapping can funnel, consists in the employment of a tapering or conical receiving vessel, having a suitable discharge pipe or nozzle, and provided with a cutter or piercing device so that a can may be placed upon it and its contents discharged into the funnel. It is simply a sort of shallow dish, made somewhat funnel-shaped, having a sort of nozzle of suitable size or shape to enter a receiving can. This funnel-shaped dish is set on top of the receiving can, and has a vertical cutter or knife projecting up from it. When it is desired to pour a can of coal oil for instance into the receiving can, the can of oil is set down on the dish, when the cutter pierces it and the contents run into the dish and thence into the receiving can. The device is useful for tapping and emptying any cans that contain coal oil, turpentine, alcohol, or other fluids that will flow through a funnel.

GATE.—A. G. Rockfellow, Ashland, Oregon. The patent covers an improved gate, which can be used either as a house-yard gate, to be opened and closed by hand, or as a farm-gate, to be opened and closed by cords leading to and over pulleys at a distance from the gate. The object of the invention is to provide a gate with adjustable bearings, hangings and fastenings, which can be quickly and easily adjusted to the varying conditions of the gate in wet and dry weather, so as to always preserve its freedom of motion and operation. The bearings and fastenings are strong and substantial and at the same time ornamental, so that the gate presents a handsome appearance and is convenient to operate.

BOILER COVERING.—Gilbert C. Fowler, S. F. The improvements relate to the manufacture of such plaster material as is used for surrounding steam boilers, steam pipes and other heat-radiating surfaces with a non-conducting coating or covering in order to arrest waste of heat. Mr. Fowler adds some new ingredients to those commonly in use for the purpose of preventing the cracking caused by alternate expansion and contraction of the material. The new pulp is also a good non-conductor and mixes well with other substances so as to form a homogeneous mass which forms a durable non-conducting shell or case.

AMALGAMATOR.—J. H. Hohart and Chas. W. Stuard, Oakland. This invention is an improvement in that class of amalgamators in which the pulverized ore, black sand, tailings or other material containing valuable metals, is carried into and beneath a body of mercury. It consists in the employment of a series of chambers containing mercury, into which the feed and connecting pipes dip and through which the sand is forced by gravitation, suitable distributors being employed. Between each pair of the series are placed sluices containing riffles, the whole terminating in a tailings or settling-box.

DERRICK.—J. D. Winters, Grand Island. This invention relates to certain improvements in wagon derricks, and consists in a novel method of attaching the foot of the derrick to the wagon, in combination with a device for raising the derrick from a horizontal to a vertical position upon the wagon. The arrangement is such that the derrick can be carried conveniently on the wagon and raised quickly and easily to a vertical position when desired.

UNLOADING NET.—J. D. Winters, Grand Island, Colusa county. This patent covers an arrangement for connecting and disconnecting the two parts of a netting, such as is used for unloading header wagons. The arrangement is extremely simple and strong, and the disconnecting apparatus obviates the necessity of using a spring or other device of doubtful strength and action.

CROWN POINT.—The annual election of the Crown Point mining company was held on Monday last. The report of the Secretary for the present year shows receipts amounting to \$575,391.35, of which \$369,101.53 came from assessments and \$133,500.76 from bullion. The present liabilities are \$49,445.02, of which \$42,461.35 is overdrawn at the Bank of California. During the past year the expenses of the mine were reduced \$372,863. The Superintendent's report is an exhaustive review of work accomplished, and holds forth the hope that at great depths a body of pay ore will be developed. The following Board of Trustees was elected: J. P. Jackson, J. D. Fry, C. L. Weller, J. H. Robinson and A. K. P. Harmon. The stockholders' meeting then adjourned. At a subsequent meeting of the Trustees C. L. Weller was elected President; A. K. P. Harmon, Vice-President; James Newlands, Secretary and S. L. Jones, Superintendent.

The South Pacific Coast Railroad.

There is no one agent which has done as much to render possible the rapid development of the western regions of the United States as the railroad. Not only has it developed the physical resources of the minor regions, but by bringing into intimate personal acquaintance people from the remote parts of our immense country, it has done much to do away with sectional prejudice, and that whole class of serious misunderstandings which have already proven so dangerous to the existence of our government.

It is, therefore, with no little pleasure that we record each new move forward in this direction. Of late the narrow-gauge system has done much to make possible the extension of railroad facilities to new and undeveloped regions like those of the larger part of the Pacific Coast. We regard these narrow-gauge roads of the very greatest importance to our sparsely settled mining, timber and agricultural districts, and for this reason devote some little space to the newest example in that direction, the Bay and South Pacific Coast Railroad.

This road is projected to run from San Francisco to Santa Cruz, and its route is shown in the accompanying map. The upper end of the road as far as Newark is called the Bay and Coast Railroad, the remainder of the road the South Pacific Coast Railroad, though the officers of the two companies are at present identical and the roads are practically one and the same. From San Francisco the start is to be made on one of the two fine double-ended ferry boats, *Newark* and the *Bay City*, which were built for the company. These vessels are to run to

The Northern Terminus of the Road.

At the mouth of San Antonio creek. Here, owing to the recent improvements of the Oakland Harbor Commissioners, there is an opportunity for a fine landing. A large wharf has been built, 800x220. An engine-house and turn table have been built, and sheds are soon to go up. An artesian well 275 feet deep has been sunk and yields a good supply of fine water. The wharf is firmly and solidly built, the piles being run through 30 feet of tough mud and then through two or three feet more of good hard sand. There is 10 feet of water at present at the wharf at low tide, and four dredgers are at work clearing out the bottom to the depth of 15 feet. An interesting little feature of the engineering is the utilization of the mud from the dredging for embankment. Usually this is removed by towing the mud scows out to deep water and discharging it, where it at least does no good, if it does not occasion positive harm. The mud here is a very tough blue clay and the engineer in charge, Mr. W. P. Drumm, has built a railroad wharf 1,100 feet out to deep water, and has had the mud discharged from the dredger into the flat cars on which it is hauled to the place where it is needed on the road. It dries out rapidly and makes a very solid embankment.

From the creek landing the road runs across the marsh to the end of Alameda point around the residence of Gov. Haight, then down through the town of Alameda, and then along the coast through numerous small stations to

The Future Town of Newark.

This town site is very similar to that of Oakland, is almost perfectly level and will no doubt in time be a business center for the surrounding fertile country. At present there are built a round house, offices, etc., and the car shops, where are built all the cars used on the road. Mr. Martin Carter has charge of this work, he employs from 30 to 40 men in putting up these cars which are built from the wheels up. The iron work, with the exception of the wheels, which come from the East, is all done in San Francisco. The locomotives are built at Baldwin's, Philadelphia.

The Rolling Stock

At present consists of 100 platform cars, 10 box cars, 9 hand-cars, 4 baggage cars, 14 passenger cars, 8 locomotives, and is being constantly increased.

From Newark the road runs across the great marsh which forms the head of the Bay of San Francisco, and so reaches Santa Clara. The greater part of the road up to this point is not

of any special interest from an engineering standpoint, as it runs along a perfectly level country. But it is very solidly built, even across the extensive marshes. It is ballasted very thoroughly with gravel from Los Gatos creek. The country through which it runs is apparently of the most fertile kind, the grain was almost everywhere on a level with the tops of the fences, and along the track the wild mustard grew frequently over the tops of the cars. The road thus reaches

San Jose.

Where a neat and commodious station is built. Thence it runs about nine miles up a gentle incline to the foothills along Los Gatos creek to the pretty little town of

Los Gatos.

This is at present the end of the road, stages

grade of on an average 70 feet to the mile has been secured from Los Gatos to the summit of the road in tunnel No. 3. From Los Gatos the road runs along the creek for one and one quarter miles. Here it crosses the creek by a combination Howe truss of 87 feet span. Then follows half a mile of the most difficult work on the road. The track runs along the face of a high, shingly bank. In running the preliminary survey the men had to be lowered by ropes in order to establish their points, and of course on such a steep incline the cut and fill are both extremely difficult. The town of Lexington is familiar to all travelers on the old Santa Cruz road as one of the stage stations. It contains a hotel, a stable and a blacksmith shop. The next mile and a half is on a fair level piece of ground with no special difficulties in the

the road has not been definitely located, though preliminaries have been run. The road will, however, take in Felton on its way to Santa Cruz. It will probably run down Bean creek for one and one-half miles from tunnel No. 4 to the spur which will necessitate tunnel No. 5, of about 1,200 feet, and then to Felton at the junction of Zyante creek and San Lorenzo river.

Felton

Is a small town, which is at present the terminus of the Santa Cruz and Felton railroad. It is the center of the great lime industry and the terminus of several lumber flumes.

The Tunnels

Of this road are so extensive that some special mention of them is necessary. We will take them up in their order and recapitulate: Tunnel

No. 1, caved in, now an open cut; tunnel No. 2, 190 feet; tunnel No. 3, 6,155 feet; tunnel No. 4, 5,800 feet; tunnel No. 5, 1,200 feet, probably. The ground in which they are built seems, as far as yet opened, to be of nearly the same nature, a dark, clay slate, firm when first opened, but swelling on being exposed to the air and necessitating very solid timbering.

The tunnel is arched at the top and its sides incline slightly from the spring of the arch to the floor. The distance from the crown to the floor is 16 feet three inches. The span of the arch is 13 feet. The width of the floor is 11 feet four inches. The timber is all 10 by 12-inch stuff. The arch is made in six pieces. Each is three feet 10 inches on the top and three feet four inches on the bottom. A flat rod of iron runs through each of these joints, connecting each set of timbers firmly with the adjacent ones. Behind the timbers, four by four-inch lagging is placed all around throughout almost the entire length of the tunnel. This is necessitated by the shifting nature of the ground. The tunnel is quite dry and the air of the tunnel No. 3 is strongly impregnated with petroleum and at one time the whole face of the tunnel ignited and flamed up for several seconds. Large numbers of fossil shells have been found in those excavations. They very much resemble the clam and periwinkle shells found at present on our beaches. They have been pronounced by Mr. R. E. C. Stearns, as belonging to the tertiary period. Tunnel No. 3 is at present in 600 feet at the north or Santa Clara end. The south or Santa Cruz end is giving much trouble, as the ground is full of water and very uncertain. A small drift, six by six feet, has been put in about 160 feet, and it is the intention to widen this out to the full size as soon as firm ground is reached. The faces of tunnel No. 4 only have been opened and the rest of the tunnel work is all in the future. It is expected that it will take at least a year to complete these tunnels, and that by the time they are down the rest of the road will be built and the connections only will have to be made.

The highest point on the road is the center of tunnel No. 3, which is 803 feet above the sea level and 690 feet below the crest of the range at that point. The tunnel beds falls three feet in 100 each way from the center. The maximum grade on the road is 90 feet to the mile. The average grade from Los Gatos to tunnel No. 3 is 70 feet to the mile. The maximum of curvature is a 16° curve.

There are several engineering features which we hope to speak of more fully in the future, when the mountain work is more fully developed.

From what we have seen of the road, we predict for it a promising future. The beauty of its mountain scenery will certainly render it one of the most popular roads in the State, and we think it will secure all the passenger traffic to Santa Cruz, as well as do much to develop the industrial resources of this region.

The officers of the company are as follows: A. E. Davis, President and Treasurer; B. B. Minor, Secretary; Thomas Carter, Superintendent; G. H. Waggoner, General Passenger Agent.

A fire at Weaverville, Trinity county, last week, which commenced in Chinatown, owing to the carelessness of Mongolians, destroyed 15 houses and caused a loss of \$6,000.

CONSIDERABLE interest is being manifested in the approaching election.



MAP SHOWING THE ROUTE OF THE SOUTH PACIFIC COAST RAILROAD.

making connection here with Santa Cruz. The track is laid and ballasted to this point, and a through train leaves here at present at 6:30 A. M. daily, the trip to Alameda being made in two hours and a half. Returning it arrives at 7:30 P. M. Los Gatos is said to produce the best flour in the State. It is the center of supplies for that part of the country. It contains a couple of hotels. The one near the railroad has recently changed hands, and under the management of Mr. Eddy promises to be a pleasant stopping place. The mountain work proper begins at Los Gatos, and several lines were run before the present and most feasible one was adopted. This piece of engineering is being carried on under the direction of Mr. E. H. Mix, to whose kindness we are indebted for many of our facts. The road finally selected continues up Los Gatos canyon until at its head it pierces the mountains in several quite extensive tunnels. These tunnels are of course expensive, but by this means a very moderate

way. It is proposed to establish in this little valley a station for that part of the country. Here comes the second crossing. From this point the work becomes more or less difficult from the rough and irregular ground which makes cutting and filling both quite heavy. The road crosses the creek six times before reaching tunnel No. 3, at a distance of seven and a half miles from Los Gatos. Tunnel No. 3 is where the road pierces the main ridge, and is just at the county line, one end opening into Santa Clara county, the other into Santa Cruz. The center of this tunnel is the highest point on the road. It is to be 6,155 feet long, and will be spoken of more in detail later. The road then runs for 4,500 feet through a steep canyon, heavily wooded. This part of the road may be described as extremely picturesque and expensive. Then comes tunnel No. 4. This runs for 5,800 feet through a spur which it was decided to pierce for the purpose of opening up the fertile region beyond. Beyond this point

[From a previous issue of the Press.]

An Improved Fileholder.

An article which is valuable mainly for its usefulness, if simplified without being made less effective, is improved. The fileholder illustrated herewith is an invention of this sort. Like the short horse soon curried, its operation is briefly described. Its merits, however, are not so quickly noted in words as observed by sight.

To file newspapers, or other printed matter, the round rubber band slipped over the inclined end of the upper bar into the notched end of the lower bar. With the lower bar resting on a table, the upper bar is swung vertically or sideways, leaving the points for receiving the papers entirely unobstructed. The hinged ends of the bars, being rounded and held elastically, the upper bar is easily and naturally brought back to the right position, where it is quickly fastened by slipping the adjustable band over the incline.

Among the advantages gained by this holder are the following:

It can be opened and closed quicker than others.

The points are less obstructed while the articles to be filed are being placed.

The papers (wholly or partly folded) can be either "straddled" over the lower bar or filed in regular book order.

The elastic hinge and band accommodate and hold firm either a large or a small number of papers.



Devoid of all surplus material, it approaches nearer to bookbinding than other fileholders. With less material, it is lighter and less cumbersome than other holders.

It has no protruding ends to tickle the reader's ribs; no sharp corners or metal parts for defacing furniture.

It has no rigid hooks, hinges or loose parts to break or get lost.

It has proved durable in practice. Consisting of so few parts, the two strong rubber rings are the only portions possible to wear out. These can be replaced at trifling cost. The file is adjusted but 52 times a year for a weekly paper. A sample holder can be opened and closed 1,000 times without showing depreciation.

Having, as a publisher, considerable use for fileholders, the inventor could find none of the hundred different kinds patented or in use devoid of decidedly objectionable features. For this reason he adopted and used some of the simplest forms conceivable. After several years' use and repeated improvements, the device we illustrate has proved the best.

The patent was allowed in April, 1876, since which time many holders have been used, giving full satisfaction. About 100 have had constant handling in the Free Reading-Room, Oakland, Cal., rendering full measure of satisfaction.

Five sizes are made to suit the dimensions of different papers, viz.: 18, 22, 26, 30 and 34 inches, inside measure.

From our own experience and the testimony of others, we do not hesitate to recommend this simple article as the best of its kind.

Samples will be mailed from this office for 50 cents, post-paid.

Orders will be received by the S. F. News Co. The price list will also be furnished by same company on application.

OUR AGENTS.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send out no hut worthy men.

J. L. THURP—San Francisco.
B. W. CROWELL—California.
A. C. KNOX—Pacific Coast.
C. N. WEST—Santa Cruz, Monterey and San Benito counties.

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W. M. BREWER—Black Hills, Dakota Territory.
RICHARD ALEX.—British Columbia.

R. D. NUNNALLY—Siskiyou County, Cal.

MR. W. J. WOODLEY, who took out a Canadian Patent some four years ago, is requested to call at the MINING AND SCIENTIFIC PRESS PATENT AGENCY OFFICE. Business of importance.

Mining and Scientific Press Patent Agency.

Our U. S. and Foreign Patent Agency presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system and intimate acquaintance with the subjects of inventions in our new community. All worthy inventions patented through our Agency will have the benefit of a description or an illustration and explanation in the MINING AND SCIENTIFIC PRESS or the PACIFIC RURAL PRESS. We transact every branch of Patent business, and obtain Patents in all civilized countries. The large majority of U. S. and Foreign Patents granted to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Advice and Circulars Free. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior.

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A portion of the work, which can be finished thereby more perfectly than by the eye and hand alone. Our patrons can depend upon first-class work always, and at reasonable prices. Samples can be seen at our office.

DEWEY & CO.**TO QUERISTS.**

In propounding questions to the editorial, patent or business departments of this office, letter writers should be careful to enclose a stamp and addressed envelope if they wish prompt answer. If we were to furnish time, paper, envelopes and stamps, all free to parties who address this office on matters of more interest to themselves than to us, FIVE HUNDRED DOLLARS A YEAR would not cover the expense. This hint, however, is not intended for parties writing in our own or the public interest, or who would be obliged to delay writing at any time for want of an extra stamp.

EVERY new subscriber who does not receive the paper and every old subscriber not credited on the label within two weeks after paying for this paper, should write personally to the publishers without delay, to secure proper credit. This is necessary to protect us and subscribers against the acts and mistakes of others.

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A first-class 16-page Illustrated Agricultural Weekly, filled with fresh, valuable and interesting reading. Every farmer and ruralist should take it. It is immensely popular. Send for a sample copy.

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BY GUIDO KUSTEL,

MINING ENGINEER AND METALLURGIST.

Roasting of Gold and Silver Ores, and the Extraction of their respective Metals without Quick silver. 1870.

This rare book on the treatment of gold and silver ores without quicksilver, is liberally illustrated and crammed full of facts. It gives short and concise descriptions of various processes and apparatus employed in this country and in Europe, and explains the why and wherefore.

It contains 142 pages, embracing illustrations of furnaces, implements and working apparatus. It is a work of great merit, by an author whose reputation is unsurpassed in his specialty. Price, \$2.50 coin, postage free.

Concentration of Ores (of all kinds), including the Chlorination Process for Gold-bearing Sulphurets, Arsenurets, and Gold and Silver Ores generally, with 130 Lithographic Diagrams. 1867.

This work is unequaled by any other published, embracing the subjects treated. Its authority is highly esteemed and regarded by its readers; containing, as it does, much essential information to the Miner, Metallurgist, and other professional workers in ores and minerals, which cannot be found elsewhere in print. It also abounds throughout with facts and instructions rendered valuable by being clearly rendered together and in simple order. It contains 130 diagrams, illustrating machinery, etc., which alone are of the greatest value. PRICE, \$7.50.

Much Obligated, Etc.

PORTLAND, OREGON, June 20th, 1877.

DEWEY & Co., Patent Solicitors, S. F.—Gents: I am much obliged to you for courtesy shown me, and am much pleased with the manner in which you have done my business, and assure you, will cheerfully recommend you to my acquaintance needing such services. Hope to have a case again before long, of my own. I have been an inventor all my life, but let others reap the benefit, or had work taken from me. Please have the extra copies of my patent, etc., mailed to me direct, and oblige.

Yours truly, J. H. WOODRUM.

APPRECIATION ABROAD.—We copy the following from the *Mining and Metallurgical Gazette*, of London, England: "We deemed it advisable, as affording valuable information to our readers, to publish in recent issues of *The Gazette*, the full text of the 'United States Mining Laws and Instructions, by the Commissioner of General Land Office, taken from our talented contemporary, THE MINING AND SCIENTIFIC PRESS, of San Francisco. The documents have now been issued in a handsomely bound volume by Messrs. Dewey & Co., the publishers of our transatlantic contemporary, and it will be found very useful to those already interested in American mines, and to others who may be tempted to embark in that enterprise in the States."

PROMPT AND SUCCESSFUL.—Messrs. Dewey & Co.—Gentlemen: Your Circular letter, 12th inst., informing me of successful termination of my application for patent received. Please accept thanks for the prompt and successful manner in which you have managed this business. Yours respectfully, J. H. CAVANAUGH.

Walla Walla, Dec. 24th.

Certificate of Partnership.

The undersigned having, January 1st, 1878, formed a partnership to carry on the business of general machinists and engineers in constructing and repairing machinery under the firm name and style of Birch, Argall & Co., this certifies that the principal place of business of said partnership is situated at 119 Beale street, in the city of San Francisco, State of California, and that William H. Birch and John Argall, each residing in said city, are all the members of such partnership.

Wm. H. BIRCH. [Seal.]
JOHN ARGALL. [Seal.]STATE OF CALIFORNIA,
CITY AND COUNTY OF SAN FRANCISCO, } ss.

On the twenty-fourth day of May, A. D., one thousand eight hundred and seventy-eight, before me, J. Robert Read, a notary public in and for said city and county, residing therein, duly commissioned and sworn, personally appeared William H. Birch and John Argall, known to me to be the persons described in whose names are subscribed to, and who executed the annexed instrument, and they acknowledged to me that they executed the same.

In witness whereof I have hereunto set my hand and affixed my official seal, at my office, in the city and county of San Francisco, the day and year last above written.

J. ROBERT READ, Notary Public.

[Seal.]
Endorsed—Filed May 29th, 1878.
THOS. H. REYNOLDS, County Clerk.
By J. WIALES, Deputy Clerk.

—THE—

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It is not surpassed by any dining house in the city. The saloon is new, commodious, elegant and comfortable, and all visitors to San Francisco, who wish good food well prepared and properly presented, at reasonable prices, should try the "Palace." Being new, it is fitted up with the latest and best approved cooking apparatus and other conveniences for patrons.

Tip-top Dinners, 50 Cents,

Are given from 5 to 8 o'clock P. M. It will pay yourself and friends, too, to go considerably out of your way to visit and patronize this first-class restaurant.

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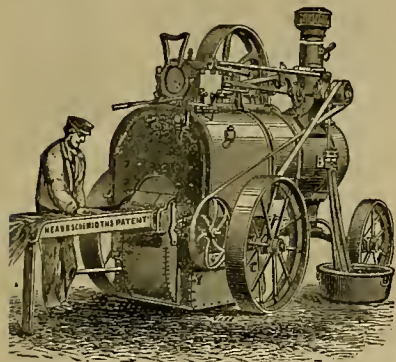


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The cost of Roasting and Chloridizing is as follows:
One man, per day.....\$ 3 50
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Wood, 1 1/2 cords at \$3.....7 00

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R. H. CAMPBELL, Superintendent Afterthought Mine, Redding, Shasta County, Cal.

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Engine of 1877, of one horse-power,
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Recent Improvements,

Made especially to meet the requirements of the heavy work of this Coast, and now giving perfect satisfaction in the many mills in which they are in use.

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Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending May 16.	Week Ending May 23.	Week Ending May 30.	Week Ending June 6.
Alpha.	8	7	107	113
Alta.	73	7	5	6
Andes.	40c	35c	50c	45c
Alps.	14	15c	35c	20c
Argenta.	20c	35c	20c	30c
Baltimore Co.	3	2.20	2.60	2.10
Belcher.	3	2.20	2.60	2.10
Belmont.	35c	30c	30c	15c
Best & Belcher.	13	10	12	12
Bullion.	3	3.10	4	3.30
Butte.	2.10	2	1	2
Bodie.	1.30	1	1	1.60
Benton.	1.55	1	1	1.30
California.	12	1.75	1.60	1.20
Challenger.	25	21	21	21
Chollar.	26	21	21	21
Confidence.	3	3	3	3
Con Imperial.	14	12	12	12
Crown Point.	4	3	3	3
Day.	25c	25c	25c	25c
DeFrees.	15c	50c	40c	50c
Eureka Co.	60	50	50	50
Excelsior.	2.30	2	2	2.85
Endowment.	90	75	75	85c
Gen Thomas.	3.40	3	3	3.20
Gila.	75c	1	1	1.10
Golden Chariot.	50	35	50c	40c
Gould & Curry.	4	4	4	4
Hale & Norcross.	4	4	4	4
Hussey.	4	4	4	4
Julia.	1.40	1.45	7	8
Justice.	4.45	3.85	4	4
Joe Schell.	4	3	3	3
K. K. Co.	2.30	2	2	2
Kentuck.	2.30	2	2	2
Kosuth.	5c	5c	5c	5c
Lady Wash.	35c	40c	40c	50c
Leopard.	15c	15c	15c	15c
Leviathan.	15c	15c	15c	15c
Leeds.	11	11	11	11
Modoc.	3	2.50	2	1.80
Manhattan.	8	7	8	8
Meadow Valley.	15c	15c	15c	15c
Mexican.	8	7	9	8
Northern Belle.	60c	30c	35c	30c
New York.	80c	30c	35c	30c
Northern Belle.	1	1.35	1.20	1.20
New Oso.	30c	20c	20c	20c
Nevado.	30c	20c	20c	20c
Occidental.	30	25	25	25
Ophir.	30	25	25	25
Overman.	25	15	15	15
Panther.	25	15	15	15
Raymond & Ely.	3	2	4	3
Rio Island.	10	8	10	10
Sage.	10	8	10	10
Sierra Nevada.	3.85	2	2.85	4.15
Silver Hill.	1.60	1.10	1	1.20
Succor.	45c	35c	25c	20c
Solid Silver.	21	11	1	20
Star.	11	11	1	20
Trojan.	60c	25c	40c	25c
Union Con.	3	2.90	4	5
Utah.	8	6	9	7
Wells-Fargo.	25c	35c	30c	40c
Woodville.	25c	35c	30c	40c
Yellow Jacket.	6	7	6	8

Sales at S. F. Stock Exchange.

Friday A. M., May 31.	890	Bodie.	2.50	2.85
130 Alta.	6	1225	Con Virginia.	14
120 Alpha.	10	50	Confidence.	4.15
250 Andes.	45c	255	California.	21
100 Argenta.	35c	130	Challenger.	21
255 Best & Belcher.	14	335	Crown Point.	3.70
225 Belcher.	2	2330	Con Imperial.	80
1225 Benton.	1.95	430	Caledonia.	1.90
555 California.	20	100	Con Washoe.	20c
1200 Con Virginia.	1.20	1430	C P Ravine.	30c
770 Crown Point.	3.30	50	Dayton.	30c
1455 Con Imperial.	80	150	Day.	25c
20 Confidence.	4	1800	Endowment.	80
225 Caledonia.	1.80	25	Excelsior.	2.80
1230 Crown Point Rav.	30	195	Eureka Con.	50
60 Chollar.	25	30	Falcon.	30c
50 Dayton.	25c	685	Gould & Curry.	6
455 Excelsior.	2.00	130	Grand Prize.	3.45
100 Gould & Curry.	6	180	Hale & Norcross.	7
80 Hale & Norcross.	70c	1180	Hale & Norcross.	7
255 Justice.	3.60	400	Hussey.	35c
2210 Julia.	7	115	Hamburg.	31
400 Leviathan.	15c	230	Hillside.	1
1500 Mexican.	10	1500	Justice.	1
250 New York.	50c	400	Homestake.	6
1950 Ophir.	35	470	Independent.	1.50
365 Overman.	11	510	Justice.	3
455 Occidental.	10c	110	Julia.	7
50 Ophir & Ely.	1	10	Jackson.	10
1250 Savage.	12	300	Leviathan.	10c
825 Sierra Nevada.	4	100	Leopard.	10c
1650 Silver Hill.	11	40	Mexican.	25c
775 Succor.	35	400	Mexican.	10
600 Trojan.	25	485	Modoc.	11
170 Utah.	9	650	Northern Belle.	2.15
330 Union Con.	4.60	150	New York.	50c
50 Woodville.	30c	750	Ophir.	45
2450 Wells-Fargo.	35	75	Ophir.	45
330 Yellow Jacket.	8	75	Occidental.	1.05

740 Endowment.....	85c@3	160 Yellow Jacket.....	88c@1
740 Excelsior.....	2.62@2.60	Munday A. M. June 3.	
85 Grand Prize.....	3	300 Alpha.....	61c@10
775 Gila.....	1.20@1.10	110 Alta.....	61c@10
280 Gould & Curry.....	63c@6	340 Best & Belcher.....	14@13
350 Hussey.....	40c	850 Belcher.....	2.40@2.20
700 Hillside.....	1	635 Benton.....	4.15@4.40
50 Homestake.....	6	625 Boyle.....	1.85@5.00
500 Homestake.....	6	625 Boyton.....	30c@40
70 Hamburg.....	3.10@3	910 California.....	21c@20
510 Hale & Nor.....	7.4@7	1425 Con Virginia.....	14@14
2300 Independent.....	2.10	200 Con Washoe.....	20c
120 Jackson.....	3.3@3	200 Con Imperial.....	80
1500 Julia.....	7	330 Crown Point.....	3.70@3.60
160 Leopard.....	10c@5c	40 Chollar.....	27c@26
420 Modoc.....	1.70@1.5	320 Caledonia.....	1.85@1.90
440 Manhattan.....	70c@6	455 Excelsior.....	2.70@2.20
530 Mexican.....	10@10	455 Gould & Curry.....	6
145 Northern Belle.....	2.10	455 Hale & Nor.....	63c@6
240 Newark.....	1.80	500 Indepen.....	1.80@2
100 New Coso.....	1.20	130 Justice.....	3.60@3.70
875 Navajo.....	20c	1170 Julia.....	7
1315 Ophir.....	43@44	100 Leviathan.....	10c
100 Raymond & Ely.....	15	415 Mexican.....	10@10
1950 Silver Hill.....	11	415 Modoc.....	11
300 Sierra Nevada.....	4.05@4.10	255 Overman.....	11c@11
1010 Savage.....	11@12	95 Occidental.....	1.05
890 Union Con.....	4.60	100 Rough & Ready.....	1
Saturday A. M. June 4.		1550 Trojan.....	30c
200 Andes.....	50c	1430 Savings.....	1.60@1.60
680 Alpha.....	10@11	485 Silver Hill.....	1.10@1.00
495 Alta.....	63c@6	350 Sucor.....	20c
100 Argenta.....	30c	200 Solid Silver.....	2.40
100 Alps.....	35c	1550 Union Con.....	4.90
800 Bullion.....	4.25	20 Utah.....	30c
250 Best & Belcher.....	14@14	235 Union Con.....	4.90@4.80
905 Belcher.....	2.40@2.45	700 Wells-Fargo.....	35c@40
20 Bodie.....	2	200 Yellow Jacket.....	88c@8

AFTERNOON SESSION.		740 Mexican.	105@201
330 Alta.	30c	340 New York.	50c
400 Alps.	10.10@15	450 Overman.	13@122
800 Argenta.	30c	1185 Ophir.	45@451
150 Best & Belcher.	14	1185 Ophir.	45@451
335 Belcher.	2.4@2.40	585 Sierra Nevada.	4.05@24
600 Bodie.	31@3.55	790 Savage.	11@102
330 Bullion.	4.10@4.15	525 Solid Silver.	2.55
150 Con Virginia.	1.85	530 Silver Hill.	11
135 California.	21@20	530 Silver Hill.	11
810 Crown Point.	3.65@3.60	2350 Trojan.	25@35c
250 Con Imperial.	80c	150 Union Con.	4.90@4.95
1000 Caledonia.	1.85	50 Utah.	1
1000 DeFrees.	25c	140 Wells-Fargo.	35
200 Eureka Co.	55@54.50	4630 Wells-Fargo.	35
760 Endowment.	80@85c	70 Woodvil e.	40@30c
800 Gila.	30@35c	135 Yellow Jacket.	8
1000 Grand Prize.	3.35@3.45	AFTERNOON SESSION.	
330 Gould & Curry.	6@6.5	150 Argenta.	30c
150 Hillside.	1	250 Arizona.	15c
300 Homestake.	6	350 Bodie.	3
200 Homestake.	6	250 Belcher.	4
500 Homestake.	6	250 Belcher.	4
75 H & Norcross.	63@63	2335 Bullion.	14@24.85
500 Independent.	1.30@12	50 Belcher.	70
580 Justice.	34@3.55	110 Best & Belcher.	14@14
760 Leopard.	55@60	7200 Best & Belcher.	14@14
470 Modoc.	1.50	270 Con Virginia.	14
395 Manhattan.	61@62	160 Caledonia.	1.90@2.05
200 Mexican.	10@10.25	170 California.	20@20.85
145 Northern Belle.	2.10@2.1	250 Con Imperial.	80@85
505 Newark.	2.15@2.2	250 DeFrees.	20@25c
10 Northern Belle.	7	800 Endowment.	80@85c
545 Ophir.	40@40.40	100 Eureka Con.	57@58
25 Raymond & Ely.	15	1000 Grand Prize.	3.45@3.5
1950 Silver Hill.	11	150 Gila.	80@75.5
300 Silver Prize.	10	100 Golden Chariot.	40c
555 Silver.	10@10.60	100 Gould & Curry.	6
75 Silver King.	11	112 Hamburg.	31
575 Sierra Nevada.	45@46	1084 Hillside.	1
1315 Ophir.	11@11.40	305 Homestake.	15@10c
600 Ward.	1.05@1.01	8235 Independent.	1.90@2
60 Yellow Jacket.	8	230 Jackson.	3
Tuesday A. M., June 4.		570 Alta.	6
330 Alpha.	11@11.15	595 Justice.	3.85@4
100 Amazon.	50c	150 Leeds.	1.40@1.30
400 Best & Belcher.	13@13.5	600 Leopard.	55c
330 Bullion.	4.10@4.20	140 Manhattan.	60@60
150 California.	21@21.5	450 Mexican.	10@10.25
515 Belcher.	2.35@2.30	160 Newark.	2.15
100 Boyle.	3c	935 Ophir.	44@45
200 Con Imperial.	80	110 Raymond & Ely.	15
760 Con Imperial.	80	230 Savage.	11
70 Chollar.	25	100 Standard.	25
540 Con Virginia.	1.81@1.82	1900 Star.	90@91
150 California.	19@20	1150 Silver Prize.	10c
35 Confidence.	20	1150 Silver Hill.	11
330 Caledonia.	1.85	200 Tipton.	1.40
400 Crown Point Rav.	30@30.25	55 Union Con.	4.90@4.85
300 Excelsior.	2.70@2.45	1250 Ward.	1.05
440 Sierra Nevada.	4.05@4.1	500 Young America.	2.10c
325 Hale & Norcross.	63@63.5	Thursday A. M., June 6.	
540 Justice.	3	450 Alta.	6.20@6.5
540 Julia.	7.5@7.75	580 Alpha.	11@11@11
200 Kentucky.	10@10.5	670 Benton.	1.2
50 New York.	25@25.30	665 Belcher.	4
75 Overman.	12@12.12	190 Boyle.	2.65@2.32
145 Ophir.	40@39.5	200 Boyle.	40c
440 Sierra Nevada.	4.05@4.1	2000 Con Imperial.	85@81
330 Savage.	10@10.10	2335 California.	20@20.20
300 Silver Hill.	1.00	115 Con Virginia.	14@14.4
500 Succor.	20c	115 Crown Point.	25
225 Solid Silver.	20c	115 Crown Point Ravine.	1.2
50 Union.	45@45.5	200 Con Washoe.	20c
60 Union Con.	4.80@4.65	1995 Crown Point.	4.20@4.30
100 Wells-Fargo.	35@35.40	375 Caledonia.	1.85@1.89
330 Yellow Jacket.	8.25@8.3	440 Gould & Curry.	6@6.5

AFTERNOON SESSION.			365	Hale & Nor.	7.74
190	Alta.	61	1838	Julia	8.81
300	Alps.	15c	370	Julia	4.64
150	Argenta.	11	370	Kenia	47
250	Arizona.	30c	300	Leviathan.	15c
20	B & B.	13	380	Mexican.	11
300	Bullion.	4.20	235	New York.	40
250	California.	21	130	Ophir.	47
870	Belcher.	21	685	Overman.	13
100	Belmont.	30	50	Occidental.	30c
323	Con Virginia.	13	300	Succor.	15c
353	California.	21	1075	Sierra Nevada.	4.10
350	Chollar.	25	240	Savage.	11
130	Chollar.	25	300	Silver Hill.	1.60
505	Crown Point.	3.90	1	Seg. Belcher.	18
220	DeFrees.	25c	3	Solid Silver.	2.50
200	Excelsior.	2.80	70	Utah.	81
420	Endowment.	80	70	Utah.	81
420	Endowment.	21	115	Union Con.	5
130	Eureka Con.	50	51	Ward.	1.40
300	Falcon.	30c	51	Ward.	1.40
50	Grand Prize.	35	200	Wells-Fargo.	35
350	Gila & Curry.	75	490	Yellow Jacket.	8
375	Gila.	35	300	Yosemite.	85
330	Hussey.	30c	AFTERNOON SESSION.		
700	Hale & Nor.	61	390	Alta.	85
100	Hillside.	1	70	Alpha.	10
100	Hillside.	1	180	Best & Belcher.	14
150	Independent.	1.85	30	Belcher.	2.60
35	Jackson.	3.10	1020	Benton.	1.95
470	Julia.	7	30	Belcher.	2.60
470	Julia.	7	1020	Benton.	1.95
470	Julia.	7	1020	Benton.	1.95
270	Leeds.	1.40	1020	Benton.	1.95
100	Leopard.	55c	1020	Benton.	1.95
200	Modoc.	2	1020	Benton.	1.95
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200	Modoc.	2	1020	Benton.	1.95
200	Modoc				

Pacific Board—Latest Sales.

Wed'sday A. M., June 5.		120 Silver Hill.....	1.60
10 Alpha.....	12	500 Succor.....	20c
50 Alta.....	6	210 Twin Peaks.....	35c
265 Best & Belcher.....	14	950 Trojan.....	30c
100 Bodie.....	2.40	100 Union Con.....	4.90
250 Belcher.....	2.70	950 Wells-Fargo.....	40
255 California.....	20	240 Woodville.....	1.00
950 Crown Point.....	4.30	40 Yellow Jacket.....	8
250 Caledonia.....	1.80	AFTERNOON SESSION.	
2750 Con Imperial.....	95c	100 Alps.....	10c
200 Con Virginia.....	14	50 Alta.....	6
30 Chollar.....	25	210 Bullion.....	4.65
170 Exchequer.....	2.42	55 Best & Belcher.....	14
145 Gould & Curry.....	6.30	11 Belmont.....	35c
345 Justice.....	3.70	25 Belcher.....	14
25 Imperial.....	25	110 Con Virginia.....	14
200 Mexican.....	10	210 Crown Point.....	40
400 Ophir.....	45	350 Con Imperial.....	95c
30 Overman.....	13	100 Eureka.....	58c
110 Savage.....	10	100 Gold.....	10
100 Silver.....	10	50 Gold & Belcher.....	8

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

WEEK ENDING MAY 21ST.

OSCILLATING WATER METERS.—Alvah C. Austin, Oakland, Cal.
 ORE WASHERS.—Charles O. Bagley, Oakland, Cal.
 PAPER REINFORCERS.—Julius Blumel, S. F.
 NEWSPAPER WRAPPING AND PARTING MACHINES.—Pleasant A. Chaffant, Independence, Cal.
 BOILER COVERING COMPOUNDS.—Gilbert C. Fowler, S. F.
 AMALGAMATORS.—John W. Hobart and Chas. W. Stuard, Oakland, Cal.
 SELF-TAPPING CAN FUNNELS.—Arnold W. P. Ladd, S. F.
 MEDICAL COMPOUNDS.—Charles C. Wainwright, Bishop Creek, Cal.
 WAGON DERRICKS.—John D. Winters, Grand Island, Cal.
 NETTINGS FOR UNLOADING WAGONS.—John D. Winters, Grand Island, Cal.
 WATER-GATE OR STOP-VALVE.—Alvah C. Austin, Oakland, Cal.
 WASTE TRAPS.—David Healey, Los Angeles, Cal.
 TRACK CLEARERS.—George Royal, Truckee, Cal.

TRADE-MARKS.

MEDICINAL PREPARATION.—Chas. R. Burrage, S. F.
 REMEDIES FOR COUGHS, COLDS, ETC.—Alice C. Simpson, Danville, Cal.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Encourage Your Home Paper.

Now that spring is fully open and mines are in full blast in all directions, the miners, who are beginning to harvest, should remember the PRESS, which is at all times laboring in their interest. Those whose subscriptions have run out should renew them without solicitation on our part, and should induce others to take the paper. The MINING AND SCIENTIFIC PRESS has labored diligently and steadily in upholding the mining interests of this coast for many years, and has devoted a large proportion of its space to the subject. To the mining community, therefore, we mainly look for encouragement and support. Miners should do all they can to foster and assist their home journal, and not only assist it pecuniarily but with practical suggestions and hints. We are always glad to receive letters from practical miners and mechanics on topics with which they are familiar. Such things are of value to others in the same business, and we will be pleased to disseminate such information as far as we can.

The amount it costs to subscribe for the PRESS for one year is insignificant compared with the benefits derived, since a stray hint or suggestion in its columns often saves hundreds of dollars and days of time. We glean information of all kinds from every source for the benefit of our readers, and nothing of interest or importance escapes notice. By this means we keep our readers posted on all that occurs in the mining or mechanical world at a slight expense to themselves. Those who are familiar with the merits of the journal should bring it to the attention of others, and thus assist us in a material way by enlarging our circle of readers and increasing the subscription list.

EL DORADO COUNTY FAIR.—We hear that the prospects are fine for an excellent fair at Placerville this year. The date is September 13th to 15th. The Secretary, C. H. Weatherwax, and the other officers are pushing preparations vigorously. They are building a nice one-half mile track and will have it in good shape and well finished before the opening day of the fair. Much interest is expressed by the producers of the county in the coming exhibition, and it is believed the industrial display will be better than ever made in the county before.

ALFALFA ON THE SAGE LANDS.—Along the Carson valley from Dayton to the Big Bend, fully 800 acres more of sagebrush land have been reclaimed this spring, and the growing crops look very promising. Notwithstanding the late frosts and the recent cold snaps, the alfalfa measures in many spots six inches. The crop will be ready for a first cutting by the middle of May.

The threatened difficulty between China and Siam has been averted. All the treaty powers have now recognized the complete independence of Siam.

Woodward's Gardens were never more attractive than at present. Besides three lions already mentioned, six monster living alligators, several iguanas and a boa constrictor have just been added. New stars are constantly engaged for the Pavilion exercises. Rates of admission as usual.

HAND PRINTING PRESS WANTED.—Parties having a second hand Washington or other hand printing press which they wish to dispose of, will please address this office, stating price, size and condition.

ANY PHOTOGRAPHER having a large Camera Box for sale will please notify "N. S." at this office.

MODEL MAKER AND MACHINIST.—I. A. Heald, No. 514 Commercial St., San Francisco, (fourth floor).

GENERAL MERCHANDISE.

[WHOLESALE.]

WEDNESDAY M., June 5, 1878.

BAGS—Jobbing.	Plaster, Golden
Eng Standard Wheat, 11 1/2	Gate Mills, 3 00 @ 3 25
Nordlie & Co, 22x36, 11 1/2	Land Plaster, 1 00 @ 12 50
24x36, 11 1/2	SALES.
23x40, 11 1/2	Assorted sizes, keg 3 25 @ 4 00
Machine Sew, 22x36, 11 1/2	OILS.
Flour Sacks, halves, 8 1/2 @ 10	Pacific Glue Co's
Quarters, 5 1/2 @ 6	Nestaford, No. 1, 1 00 @ 90
Eighties, 4 @ 4 1/2	Cosor, No. 1, 1 05 @ 90
Hessian, 60 inch, 15 @ 15	do, No. 2, 1 05 @ 90
45 inch, 9 1/2 @ 9	Baker's A. A., 1 25 @ 30
40 inch, 9 1/2 @ 9	Oliva, Plagiol, 5 25 @ 65 75
Wool Sacks,	Posol, 4 75 @ 65 25
Hand Sewed, 34 lb, 47 @ 50	Palma, B., 3 @ 6
4 lb do, 52 @ 52	Linseed, Raw, bbl, 72 @ 70
Machine Sewed, 47 @ 45	Bolled, 75 @ 70
Standard Gunnies, 14 @ 15	Cocoonut, 55 @ 60
Bean Bags, 7 @ 8	China nut, cas, 68 @ 70
CANDLES.	Sper, 60 @ 65
Crystal Wax, 17 @ 17	Coast Whales, 60 @ 65
Engl. Wax, 12 @ 12	Polat, refined, 60 @ 60
Patent Sper, 30 @ 34	Chity, 1 10 @ 15
CANNED GOODS.	Devon's Bril, 27 1/2 @ 25 1/2
Assorted Pic Fruits,	Photolite, 29 @ 29
2 lb cans, 2 75 @ 3 00	Nouparle, 50 @ 50
3 lb do, 3 25 @ 3 50	Eureka, 40 @ 42 1/2
Jams and Jellies, 25 @ 25	Bar's, 20 @ 20
Pickles, 1 lb gal, 3 50 @ 3 50	Downer Ker, 40 @ 42 1/2
Sardines, 1/2 box, 1 65 @ 1 90	Elaine, 42 1/2 @ 42 1/2
Hf Boxes, 3 00 @ 3 00	PAINTS.
Preserved Beef,	Pure White Lead, 94 @ 104
2 lb doz, 4 00 @ 4 00	Whiting, 11 @ 11
do Beef, 4 lb doz, 6 50 @ 6 50	Chalk, 11 @ 11
Preserved Mutton,	Paris White, 21 @ 21
2 lb doz, 4 00 @ 4 00	Ochre, 34 @ 34
Java, Tongue, 50 @ 50	Venician Red, 31 @ 31
Preserved Ham,	Avril, Mixed
2 lb doz, 6 50 @ 6 50	Paint, gal
Deviled Ham, 1 lb,	White & tints, 2 00 @ 2 40
doz, 5 50 @ 5 50	Green, Blue &
do Ham, 1 lb doz, 3 00 @ 3 00	Ch, 3 00 @ 3 50
COAL—Jobbing.	Light Red, 3 00 @ 3 50
Australian, ton, 7 00 @ 7 25	Metallic Roof, 1 30 @ 1 60
Scott Bay, 6 50 @ 7 00	RICE.
Bellingham Bay, 23 @ 23	China No. 1, B., 61 @ 62
Seattle, 5 50 @ 6 50	Hawallan, 61 @ 7
Cumherland, 14 @ 15	SALT.
Mc Diablo, 4 75 @ 6 00	Cal. Bay, ton, 15 00 @ 22 50
Lehigh, 22 @ 22	Common, 10 00 @ 12 00
Liverpool, 7 00 @ 8 00	Carmen Id., 13 00 @ 22 50
West Hartley, 7 50 @ 9 00	Liverpool fine, 20 00 @ 22 50
Scotch, 6 50 @ 8 00	SOAP.
Seranton, 13 00 @ 16 00	Castle, lb, 10 @ 10 1/2
Vancouver Id., 7 50 @ 8 00	Common brands, 4 @ 6
Caracol sack, 75 @ 75	Fancy brands, 7 @ 8
Coke, bbl, 60 @ 60	SPICES.
COFFEE.	Groves, lb, 45 @ 50
Sandwich Id, lb, 21 1/2 @ 21 1/2	Cash, 22 1/2 @ 25
Costa Rica, 18 1/2 @ 19	Nutmegs, 85 @ 90
Guatemala, 18 @ 18 1/2	Pepper Grain, 15 @ 17
Java, 23 @ 23	Plimento, 15 @ 16
Manila, 18 @ 18 1/2	Mustard, Cal,
Ground, in cs, 25 @ 25	1 lb glass, 1 50 @ 1 50
FISH.	SUGAR, ETC.
Sac to Dry Cod, 5 @ 5 1/2	Cal. Cube, lb, 11 @ 11
do in cases, 6 1/2 @ 7	Cases, 12 @ 12
Esos, 8 1/2 @ 8 1/2	Powdered, 11 @ 11
Salmon, bbls, 9 00 @ 10 00	Fine crushed, 11 1/2 @ 11 1/2
Hf bbls, 5 00 @ 5 50	Granulated, 9 1/2 @ 9 1/2
2 lb cans, 3 10 @ 3 20	Golden C, 26 @ 30
Ph Cod, bbls, 11 @ 11	Cal. Syrup, kgs, 70 @ 70
Hf bbls, 11 00 @ 11 00	Hawaiian Molasses, 26 @ 30
Mackerel, No. 1,	TEA.
Hf Bbls, 11 00 @ 12 00	Young Hyson, 35 @ 50
In Kite, 2 25 @ 2 25	Hyson, 50 @ 60
Ex Moss, 3 50 @ 4 50	Meane, 35 @ 50
Pkld Herring, 3 00 @ 3 50	Country pkd Gunpowder & Gunpowder, 50 @ 60
Boston Smk'd Hg, 40 @ 50	Hyson, 50 @ 60
LIME, ETC.	Foot Chow, 15 @ 15
Libe, Sta Cruz, 2 00 @ 2 25	Japan, 1st quality, 40 @ 60
Cement, Rosen, 2 75 @ 3 50	2d quality, 25 @ 35
Portland, 4 75 @ 5 50	

METALS.

[WHOLESALE.]

WEDNESDAY M., June 5, 1878.

IRON.	American Pig, ton, 23 00 @ 30 00
Scotch Pig, ton, 23 00 @ 30 00	White Pig, ton, 23 00 @ 30 00
Oregon Pig, ton, 23 00 @ 30 00	Refined Bar, 21 @ 34
Horse Shoes, keg, 5 00 @ 7 75	Nail Rod, 11 @ 11
Norway Oval, 11 @ 11	COPPER.
Sheathing, lb, 34 @ 35	Sheathing, Yellow, 21 @ 21
Sheathing, Old Yellow, 21 @ 21	Composition Bolt, 24 @ 24
Composition Bolt, 24 @ 24	STEEL.
English Cast, lb, 13 @ 14	Anderson & Woods, ordinary sizes, 15 @ 15
Drill, 15 @ 15	Flat Bar, 14 @ 19
Plow Steel, 8 1/2 @ 12 1/2	PLATE.
10x14 I O Charcoal, 7 50 @ 8 50	Banca Tin, 23 @ 24
Australian, 17 @ 17 1/2	ZINC.
By the Case, 9 @ 9	Zinc Sheet 7x3 ft, 7 to 10, lb, 9 @ 10
7x3 ft, 11 to 14, 10 @ 10	8x4 ft, 8 to 10, 11 @ 11
8x4 ft, 11 to 10, 11 @ 11	ASSORTED SIZES.
Assorted sizes, 3 15 @ 3 25	QUICKSILVER.
By the lb, 43 @ 45	

LUMBER.

WEDNESDAY M., June 5, 1878.

CARGO PRICES OF PUGET SOUND PINE.	RETAIL PRICE.
REDWOOD.	ROUGH, M.
Rough, M., 13 00 @ 13 00	Refuse, 18 00 @ 18 00
Refuse, 18 00 @ 18 00	Clear, 23 00 @ 23 00
Clear, 23 00 @ 23 00	Clear Refuse, 13 00 @ 24 quality, 25 00
Rustic, 23 50 @ 23 50	Refuse, 18 00 @ 18 00
Refuse, 18 00 @ 18 00	Surfaced, 20 00 @ 20 00
Refuse, 14 00 @ 14 00	RETAIL PRICE.
Flooring, 20 00 @ 20 00	Rough, M., 13 00 @ 13 00
Refuse, 18 00 @ 18 00	Refuse, 18 00 @ 18 00
Boiled Flooring, 20 00 @ 20 00	Refuse, 18 00 @ 18 00
Refuse, 13 00 @ 13 00	Pointed, 16 00 @ 16 00
Half-inch Siding, 16 00 @ 16 00	Fancy, 22 50 @ 22 50
Refuse, 14 00 @ 14 00	Refuse, 18 00 @ 18 00
Half-inch Siding, 14 00 @ 14 00	Refuse, 18 00 @ 18 00
Refuse, 14 00 @ 14 00	Refuse, 18 00 @ 18 00
Half-inch Battens, 16 00 @ 16 00	Refuse, 18 00 @ 18 00
Pickets, Rough, 11 00 @ 11 00	Half-inch Surfaced, 30 00 @ 30 00
Rough, Pointed, 12 50 @ 12 50	Refuse, No. 1, 30 00 @ 30 00
Refuse, 15 00 @ 15 00	Battens, lined ft, 30 00 @ 30 00
Shingles, 1 75 @ 1 75	Shingles, M., 2 00 @ 2 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & CO.]

SAN FRANCISCO, June 5, 3 P. M.

LEGAL TENDERS IN S. F., 11 A. M., 99 @ 99. SILVER, 2 @ 2.
 GOLD IN NEW YORK, 100.
 GOLD BARS, 830 @ 910. SILVER BARS, 82 1/2 @ 85 cent. discount.
 EXCHANGE ON NEW YORK, 1 1/2 % on London bankers, 43 @ 43.
 43 % Commercial, 50 % Paris, five francs @ dollar; Mexican dollars, 53.
 LONDON CONSOLS 95 11 1/2; Bonds, 105 1/2.
 QUICKSILVER IN S. F., by the case, 46 @ 47 1/2.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

California Fruit Growing Association.

Principal place of business, San Francisco. Location of property, El Dorado County, Cal.
 Notice is hereby given, that at a meeting of the Board of Directors, held on the third day of May, 1878, an assessment (No. 3), of three (3) dollars per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the Company, 641 Sacramento Street, San Francisco, Cal.
 Any stock upon which this assessment shall remain unpaid on the eighth day of June, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the twenty-ninth day of June, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
 D. A. BROWN, Sec'y
 Office, 641 Sacramento Street, San Francisco, Cal.

Cherokee Flat Blue Gravel Company.

Location of principal place of business, San Francisco, California. Location of works, Cherokee Flat, Butte County, Cal.
 NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 39), levied on the seventeenth day of April, 1878, the several amounts set opposite the names of the respective shareholders, as follows:
 Names. No. Certificate. No. Shares. Am't.
 J. Bandman, 11, 320, \$ 10 00
 A. Casd., 17, 408, 230 40
 Flint, Peabody & Co., 19, 150, 24 00
 Flint, Peabody & Co., 20, 140, 8 00
 Pfeiffer, E. J., 10, 480, 24 00
 Schmidt, Louis, 8, 128, 6 40
 And in accordance with law and an order of the Board of Directors, made on the seventeenth day of April, A. D., 1878, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of said Company, on Tuesday, the eighteenth day of June, A. D., 1878, at the hour of two o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
 J. W. CLARK, Sec'y.
 Office, Room 6, No. 318 Pine Street, San Francisco, Cal.

Excelsior Silver Mining Company.—Lo

cation of principal place of business, San Francisco, California. Location of works, Potosi District, Lincoln County Nevada.

NOTICE.—There are delinquent upon the following described stock, on account of assessment (No. 10), levied on the twentieth day of April, 1878, the several amounts set opposite the names of the respective shareholders, as follows:
 Names. No. Certificate. No. Shares. Am't.
 J. Antonovich, 234, 100, \$25 00
 A. W. Lind, 261, 50, 12 50
 M. Michelson, 260, 44, 11 00
 J. Michelson, 263, 100, 25 00
 H. M. Pearce, 248, 100, 25 00
 L. Trahn, 262, 50, 12 50
 Adolph Wirtner, 252, 25, 6 25
 Adolph Wirtner, 253, 25, 6 25
 Salvo Russo, 239, 25, 6 25
 Peter Wiese, 215, 50, 12 50
 Peter Wiese, 219, 10, 2 50
 Peter Wiese, 220, 10, 2 50
 Peter Wiese, 257, 30, 7 50
 And in accordance with law and an order of the Board of Directors, made on the twentieth day of April, 1878, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the office of the Company, 304 Post Street, on the tenth day of June, 1878, at the hour of one o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
 FRANCIS P. DEVINE, Sec'y.
 Office, 304 Post Street, San Francisco, Cal.

Gover Mining & Milling Company.—Lo

cation of principal place of business, San Francisco, California. Location of works, Amador County, near Drytown, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the twenty-fourth day of May, 1878, an assessment (No. 36), of fifty cents per share was levied upon the capital stock of the corporation, payable immediately in gold coin or legal currency of the United States to the Secretary, at the office of the Company, Room 8, No. 402 Front Street, San Francisco, Cal.
 Any stock upon which said assessment shall remain unpaid, on Wednesday, July tenth, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Thursday, the first day of August, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
 W. O. WILSON, Sec'y.
 Office, Room 8, No. 402 Front Street, San Francisco, Cal.

Summit Mining Company.—Location of

principal place of business, San Francisco, California. Location of works, Mineral Point Mining District, Plumas County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the third day of May, A. D., 1878, an assessment (No. 3) of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of said Company, Room 6, No. 318 Pine Street, San Francisco, California.
 Any stock upon which this assessment shall remain unpaid on the eighteenth day of June, A. D., 1878, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on the Monday, fifteenth day of July, A. D., 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
 J. W. CLARK, Sec'y.
 Office, Room 6, No. 318 Pine Street, San Francisco, Cal.

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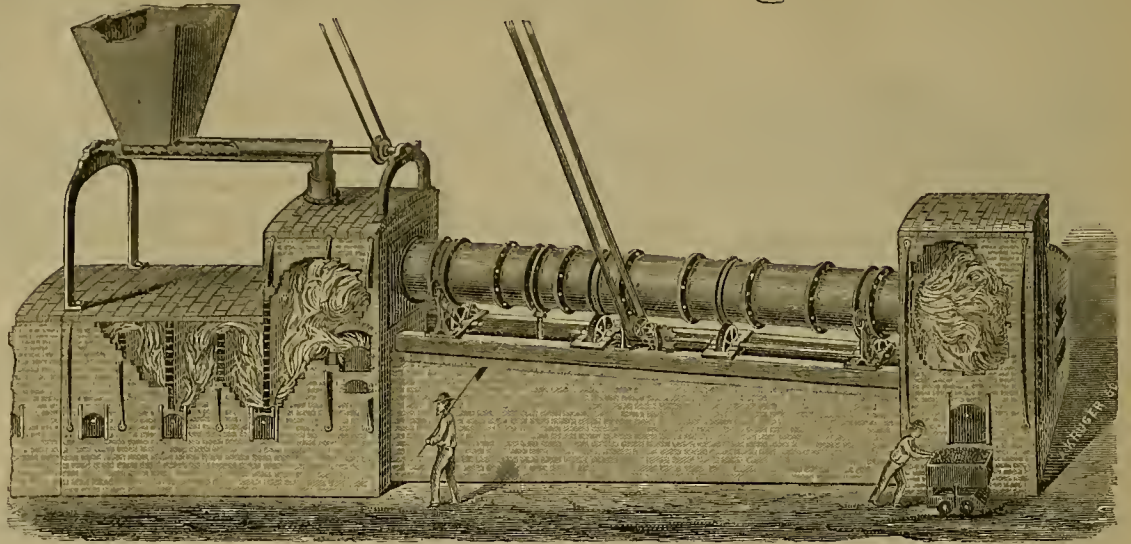
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An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, JUNE 15, 1878.

VOLUME XXXVI.
Number 24.

Motte's Mortar Mill.

There has been recently patented in Germany a grinding machine, under the name of mortar mill, which deserves the favorable notice of manufacturers who need to grind finely hard substances.

The figure shows the simplicity and solidity of the machine. It consists of a conical mortar, *a*, whose under part, *b*, is widened out into a hollow sphere. In this mortar moves a pestle, *c*, whose under part forms a segment of a sphere and whose upper part is a truncated cone. By means of a steel pin the pestle is accurately adjusted to the center of the mortar, and can, by means of a lever and screw, *e* and *f*, be adjusted at any desirable distance from the spherical bottom of the mortar. The pestle is put in rapid oscillation by means of the crank.

Material thrown into the mortar, dropping to the bottom of the cone, will be more and more grasped and crushed by the narrowing aperture. The finer pieces fall deeper into the cone, become more and more ground and finally pass between the spherical faces of mortar and pestle and are then ground to a flour, whose fineness is accurately adjusted by the screw. The grinding action of the pestle is so great that the hardest substances are almost instantly converted into powder and fall from the bottom of the mortar. In order to give the greatest amount of durability to the apparatus, the mortar, pestle and gearing wheels are made of hardened steel, as well as the pin on which the pestle turns.

Comprehensive experiments have proved the worth of this simple machine for the different objects for which it has been recommended. In many cases the now usual combination of stone-breaker, rolls and stamp mill has been replaced by a single mortar mill, which not only grinds large pieces to powder of the requisite fineness, but also with the use of less power and with a larger production.

The mortar mill is made in three different sizes and the parts are proportioned according to the particular use intended. The machine is particularly adapted to the following uses: The preparation of ores for metallurgical purposes, the grinding of stone for beds of streets and beton making, cement and mortar manufacture, the preparation of fire-clay, in porcelain and glass manufactures, in the manufacture of artificial fertilizers as well as in chemical and other industries.

The Philipsburg Mine.

[For the Press by WM. PURVINE.]

The mines of Philipsburg, Montana, were opened up in 1867, and have been worked at intervals ever since. The Hope mine, on Comanche hill, was opened the first season by a St. Louis company, and a 10-stamp mill with six of Wheeler's small pans and three seven-foot settlers erected, in which to work the ores. The mine at that time was not sufficiently developed to supply the mill with ore, and as a consequence the mill, after a brief run, had to shut down. Since that time further explorations have developed an abundant supply of ore of excellent quality to justify the company in adding 10 more stamps and otherwise enlarging their mill to double its present capacity. This mine occurs in a comparatively recent lime formation, and is a fissure vein with five to eight feet of ore of excellent quality and remarkably free, being a sulphuret of silver associated with carbonate and oxide of copper in a siliceous gangue, and is successfully treated in iron pans without roasting, using about 20 pounds salt, three pounds blue stone, and three-fourth-pound sulphuric acid to the ton. The ore is stamped through coarse screens, wet and ground three hours in the Wheeler pans before adding the mercury; 65% to 75% of assay value of the ore is recovered in the bullion which is 975 fine, with a loss of quicksilver of from two to four pounds per ton. David Carson, the Superintendent, is an excellent manager, and is making liberal dividends for his company.

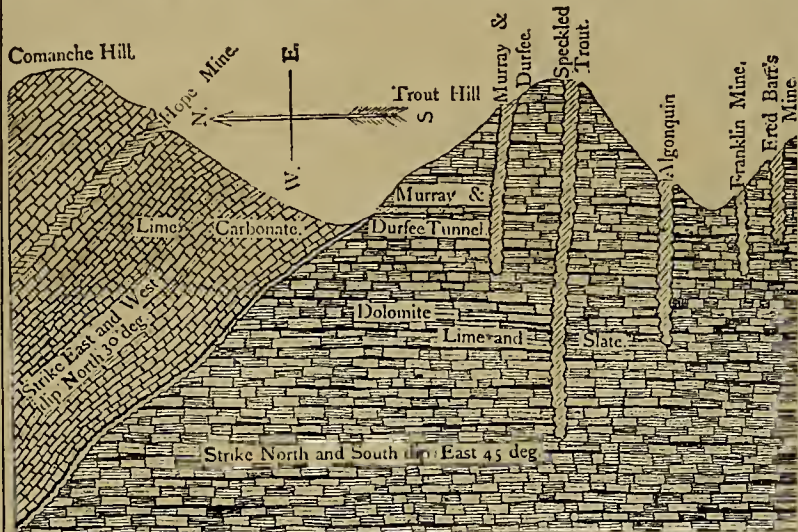
The Speckled Trout was discovered in 1867, and was opened two years later by Cole Saunders. In 1870 a double stack was erected in which to smelt these ores, but it was found that 30% of zinc, and a small percentage of lead and very refractory gangue would not smelt to

advantage. These stacks were pulled down and five-stamps with two reverberatory furnaces substituted, and the metallurgical and chemical departments managed by C. A. Speights, a very skillful metallurgical chemist, who readily extracted 85% to 90% of the silver contained in the ore. This raised Philipsburg out of "the slough of despondency." These works were limited in capacity, rickety in the extreme, and very expensive to operate, but the shipments of

tively new at the business, has displayed a great deal of sound judgment in the management.

The Algonquin company, under the skillful management of J. K. Pardee, is opening a very valuable property (the Algonquin mine), and will probably, during the season, add another to the paying enterprises of the camp.

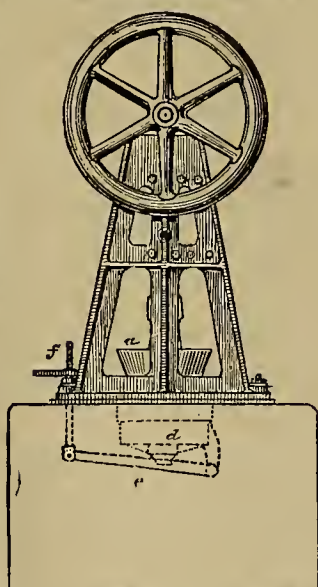
Murray, Durfee, Holland and Estell have very promising properties in the Salmon, Scratch-Awl, Startown and Blackmail mines.



CROSS SECTION OF COMANCHE AND TROUT HILLS, PHILLIPSBURG, MONTANA

bullion were immense, which induced some Philadelphia parties to buy the property, who, under the superintendence of J. K. Pardee, erected a 10-stamp mill with three Bruckner revolving cylinder furnaces and two Union pans, and two Varney pans with two six-foot settlers. The present company have added one cylinder, making four cylinders, and substituted a three-ton Purvine pan for one of the Union pans, and

The Speckled Trout is down to a depth of 330 feet, with 80 to 225 ounces ore in all the openings. The Hope mine is down 175 feet, with an immense supply of 40 to 200 ounces ore in all the openings. The Algonquin is down 180 feet, with a very great body of ore (5 to 12 feet), averaging 80 ounces per ton, with every indication of being one of the best mines in the Territory. The Scratch-Awl (Murray & Dur-



SECTION AND ELEVATION OF MOTTE'S MORTAR MILL.

added one eight-foot settler and a Hendy concentrator. The ore is roasted with 6% salt, each requiring from 15 to 24 hours' time. After roasting, the roast is screened, the lump returned to the batteries and the fine ore charged into iron fans with quicksilver, which are heated with steam, and run from 12 to 24 hours, and then discharged into the settlers. From the settlers the tailings are discharged into the Hendy concentrator, which recovers a considerable portion of what would otherwise go to waste. Frank Frisbee, Esq., although compar-

atively new at the business, has displayed a great deal of sound judgment in the management. The accompanying diagram will give the reader a good idea of the location of the various claims referred to. It shows a north and south cross section of Trout and Comanche hills, on which the mines are situated.

There are many other excellent prospects in this camp, but not sufficiently opened to determine their value. The accompanying diagram will give the reader a good idea of the location of the various claims referred to. It shows a north and south cross section of Trout and Comanche hills, on which the mines are situated.

The Timber Land Question.

As there has been some complaint in certain sections of the country about the policy adopted by Secretary Schurz for the protection of the timber on the public lands, the Secretary has addressed a letter to Congressman Page, explaining more fully the views entertained by the Department of the Interior upon that subject. Up to this time, parties cutting timber on the unsurveyed lands of the Government, have been regarded as trespassers, and, in some aggravated cases, have been prosecuted as such. While this restriction, in numerous instances, involves, no doubt, a great deal of hardship, the letter of the law, as it now stands, leaves the public officer no alternative but to proceed against offenders without regard to the peculiar circumstances under which these depredations upon the public property are committed. On this point, Secretary Schurz very properly observes that while the enforcement of the laws may be attended with much hardship in the case of miners and settlers, where the lands have not yet been surveyed, and timber cannot therefore be obtained from the Government by purchase, still public officials cannot treat the provisions of the statute as a dead letter, the only proper way for relieving these people being to change the law, adapting it to the existing condition of things which he has recommended and which will be accomplished through the passage of the Sargent bill, heretofore published and commented upon in the Press.

While this view of the question cannot be gainsaid, it would seem as if the Secretary might justly have claimed so much discretion in the premises as would have warranted him in overlooking that class of minor trespasses in which the farmer and miner take from the public domain no more timber than suffices for their own individual use, that is to say for fuel, fencing, building, the construction of flumes, sluices, etc. Where parties have gone into lumbering, making merchandise of the Government timber, they should unquestionably be stopped; more especially where they have conducted this business, as has often been the case, in a destructive and wasteful manner, nor should even the farmer or miner be permitted to help himself to this Government timber in a reckless way.

If the mountain forests possessed everywhere the property of certain and rapid self-reproduction common to those of the Sierra Nevada, their careful preservation would be a matter of less moment. But this is not the case in the arid basins of the interior. Once cut off, it will be a very long time before the timber there can be replaced, the original growth being almost everywhere comparatively stunted and scattered. Once across the Sierra and we see no more the thickly standing and stately trees characteristic of the ocean-facing slope. The summit of the great snowy range marks the line where the forests begin to dwindle. East of this the trees are smaller, more scattered, and the timber of a poorer quality. They are also of a slower growth. Broad valleys and vast treeless plains intervene between the mountain chains on which alone any timber is found. The mining States and Territories of the interior are the mostly poorly wooded sections of our entire country, save only the regions of the Platte and the staked plains of western Texas. The plan of protecting the forests on the Government domain should therefore be rigidly adhered to. The policy foreshadowed in the Sargent Timber Enactment is a good one. Surveys should be extended as rapidly as possible in order that parties desirous of purchasing these wooded lands may be able to do so. This accomplished, the Government should guard against further trespass in the most vigorous manner. Beyond this it need give itself no further trouble. With these lands once reduced to private possession, there will be an end to the wasteful use of timber.

The Grand Jury of Ventura county have found true bills for murder against Sprague, Jones, Carlee, Lord, McCart, Hunt and Churchill for the killing of T. Wallace More. The trials will commence on the first Monday in July.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Ems

Notes on Amador County.—No. 1.

[From Our Travelling Correspondent.]

New Reduction Works.

Mr. N. L. Gage has just completed at this place a reverberatory furnace of four tons capacity for reducing the gold sulphurets concentrated by the various mills here and in this vicinity. The process adopted by him being the same that has been so long and successfully used on this coast by Deitkin, Maltman and others. The furnace was built by Mr. A. C. Gove, of Nevada City, a furnace builder by trade, and who has been very successful in the construction of such works. That this enterprise will eventuate in success is much to be hoped, as additional facilities for treating this class of material are needed here. The proprietor of these works has had some experience in this line of business, and being a man of integrity will be likely to enjoy the confidence of the community should he permanently establish himself here.

Amador Reduction Works.

These works have been operated for a number of years with satisfactory results. They reduce here five tons concentrated sulphurets per day, and guarantee returns above 80% of fire assay. The proprietors do their own pulp and bullion assaying, for which they have every convenience. The business is managed by the owner, C. J. Garland, assisted by Mr. E. C. Voorhees. Mr. Garland also operates a branch at Drytown, in this county, where three tons per day are reduced.

A Telephone.

This, the last horn of the great inventions of the age, having gained a foothold in the metropolis, is making its way into the interior. Mr. Star, of San Francisco, having just established telephonic communication between this place and the Amador Lumber Co.'s office, one and one-half miles distant, and the Oneida mill, two miles distant, the instrument working satisfactorily. He is now connecting the express office here with that of the Amador Dispatch, at Jackson, four miles off, the work to be completed in a few days, after which it is probable the wire will be extended to other places in the vicinity. C. J. Nickerson, of this town, is the agent of the Bell Telephone Co. for the counties of Amador and Calaveras.

A Fine Cabinet.

Messrs. W. S. Smith and D. A. Patterson, miners of this town, are the collectors and owners of one of the finest cabinets of minerals and metals in Amador county, and one not surpassed perhaps by many in the State. Their collection embraces specimens of all the metal-bearing rock in this county, as well as some from other counties in the State and from other States of the Pacific slope. Some of these specimens are very rare and valuable, especially the collection taken from the mines in Amador. They also have a large collection of fossil shells and bones and coprolites and petrifications, found in different parts of the county, together with a great variety of beautiful crystals of siliceous, spars of all kind and color, chalcidony, smoky quartz, jasper, agates, augite, cornelians, tourmalines, serpentine, Amazon stone and many other stones, selected and arranged with a taste and judgment that evinces a knowledge of mineralogy not common among men who labor for their living, as these men do. They have also a fine display of curiosities and relics, useful and instructive, this collection being a good index to the mineralogy of Amador county.

The Oneida Mine

Is situated about half way between the towns of Sutter Creek and Jackson. In this mine a depth has been attained of 1,140 feet, there being here pay ore in sight sufficient to run their 40-stamp mill for three years. The company is incorporated in San Francisco, but the business here is managed by Robt. Robinson, a man well qualified for the trust. Adjoining the Oneida on the south is the Kennedy Gold Mining Co.'s hoisting works and mill. This company have sunk three shafts on their ledge to the depth of 800 feet, 200 feet, and 100 feet respectively, and have plenty of ore to keep their 20-stamp mill constantly employed. Superintendent, James Fleming.

The Other Mines

In this town and vicinity are represented to be in a prosperous condition. The Lincoln is owned by Senator W. M. Stewart, his brother Sam and a Scotch company. The Stewarts have leased the whole mine, Samuel being Superintendent. They have in connection with the mine a 40-stamp mill run by a four and one-half foot water-wheel—Knight's patent, which crushes 100 tons of ore per day of 24 hours. The mine and mill are in first-class condition and the owners and lessees are happy, in the realization of a fair remuneration for their investment.

Amador Con.

This is the old Eureka mine, formerly owned by Alvinza Hayward, and is noted for having the deepest shaft (2,100 feet) of any gold mine in the world. There are not, however, working

at present in their lower levels, but are taking out sufficient ore to keep their 60-stamp mill constantly at work. The Mahony, owned by the Stewart Bros., is shut down at present, though represented to be one of the best mines in the county. W. G. A. Sutter Creek, June 8th, 1878.

Determination of Minerals Under the Microscope.

EDITORS PRESS:—I notice in the last issue of the PRESS a lengthy article from the pen of Melville Attwood, Esq., which is reported to have been read before the Microscopical Society recently, in which he utters some sensible remarks upon porphyry.

While I agree with him in some of his views thus laid down, I also differ in some respects; and were it not that in entering upon that discussion it would open up the entire subject of the "status of the rock," I would like to help in his effort to establish a clearer apprehension of that special point, but must, therefore, pass it. But there is another matter of which he treats in which he hurts the cause he aims to aid, and that is his attempt to introduce the microscope in the manner which he adopts of thin plates, ground, etc. I object for its impracticalness in several ways.

To illustrate, suppose that one wanted to know if the little Amador and Amador Consolidated gold mines were on the same great ledge, were a sample each of the hanging wall of the two mines, three miles apart, presented for examination under the microscope, or otherwise, the one would show it to be a fine-grained blue trap, commonly called greenstone, while the other would show as an amygdaloid containing a large admixture of its associate talc slate.

The chemical and mechanical—if I may so call it—elements are unlike in the two mines, and yet they are, beyond a question, upon the one and the same belt of greenstone. Let him examine the rocks on the Mariposa estate and he will find the great belt of trap rocks differ widely at various points, and hence no two samples would necessarily appear the same under the microscope as used by him.

A sample of the rock associated with the Rattlesnake quicksilver mine, of Sonoma, appears to be a genuine sandstone, but another sample from the same rock, one to five feet distant, will show that it is a plutonic rock—a trachyte—and not a sedimentary rock at all.

Now it is very important that a better apprehension of the character and the status of the rocks of the earth's surface should obtain, but it is I think a grand mistake to teach the method of investigation as laid down by Mr. Attwood; for the reason that the whole matter is based upon the fallacy that rocks of any class are *unmistakably homogeneous at all points* and hence every sample of a particular belt of rocks must have the same appearance under the microscope, absolutely so, or else it cannot belong in the same relation to the mine itself of that particular belt of mines and rocks.

The evil of the view presented is that we get the attention so closely riveted upon the infinitesimal detail and littleness of mineralogy that we fail to rise to the apprehension of the few grand simple geologic truths which will disentangle the mysteries of mining.

While we are studying the infinite mineralogical detail of rocks we fail utterly to apprehend the grand, simple, comprehensive fact that in relation to the metals in veins the rocks of the earth's entire surface may be divided into three classes, viz.: the primitive, the trappean and sedimentary, and that the belt of rocks under examination at any time is not necessarily absolutely homogeneous at all points.

What we want is a clear apprehension, among experts especially, of the relations of rocks and ore veins, a work which can be accomplished only upon and after years of study and investigation with microscopic glass in hand in the fields of nature among the mines. It is no superficial holiday work that can be entered upon empirically by a trivial effort. It cannot be learned from books and hand specimens in the study and laboratory, as Mr. Attwood would seem to teach.

We have no mining science. The commonly accepted scheme of geology does not and cannot furnish an answer to the question, "What constitutes a true vein?" Hence, then, I think that Mr. Attwood's scheme of determining the true character and status of the rocks is entirely impractical and impracticable; and this attempt to teach the examination of rocks in their relation to ore veins is a mistake, and so I enter my protest right here and regret that it is not practicable to open up the entire subject of rocks and their relation. The subject is too big for the pages of the MINING AND SCIENTIFIC PRESS.

O. W. EASTON,
Geologist and Mining Engineer.

TRIUMPH OF SOBRIETY IN MAINE.—In Maine, the friends of temperance, persevering beyond example elsewhere, have finally succeeded in putting all drinks containing alcohol out of the reach of everybody in the State; or as Wendell Phillips says, "not one man in 500 in Maine can get at liquor." This has been accomplished by a series of enactments beginning about a third of a century ago. As a law was passed and found ineffectual, it was followed by another, until, at last, this degrading evil seems to be mastered and driven from the State.

Discovery of a Mammoth Cave in Wyoming Territory.

In the early part of May, a herder discovered a very remarkable cave at Table Mountain ranch, in this Territory. The entrance, instead of being horizontal, is perpendicular. Having a lariat of 50 feet, he let it down without touching bottom. He then dropped down a stone or two, and, from the reverberations, concluded it was of immense depth. Last Sunday, a dozen of us got together with ropes, a windlass, lanterns, etc., and proceeded to examine and explore it. Having fixed a strong windlass and attached a stout rope, a man descended with a lantern, his feet in a loop of the rope and holding on with his hands. It is a sheer descent of 82 feet perpendicular, to where an incline of 45 degrees commences, that upon going down about 100 feet more, becomes nearly level and branches off into various rooms, vaults and apartments. The sensation of descending is novel as well as hazardous. On reaching the bottom, I entered one of the vaults for a distance of about 300 yards, when I came to what I supposed to be the end. But on a closer examination, I discovered an aperture large enough to admit me, and, through a partition six feet in thickness, emerged into a vault of immense dimensions. Here the ceiling is fully 60 feet from the floor, and was studded with countless stalactites of all sizes, from that of a small icicle to a foot in diameter and from a few inches to 15 feet in length. The floor is also studded with cones and stalagmites, like inverted icicles, and presented a weird and picturesque perspective. In many places the stalactites are joined together, having the appearance of huge hour-glasses, and forming a number of pillars from floor to ceiling, adding to the grotesque grandeur of the scene. I penetrated about 400 yards into this vault, from which other vaults and apartments led off from either side; but, fearful of getting lost, I proceeded no farther in that direction and can only conjecture its length. Members of our party explored other vaults and passages in different directions, and from their descriptions, I conclude that the greater part of the Table mountain is fairly honey-combed by this cave and its numerous ramifications. All the passages radiate from where the incline commences, 82 feet down. The aperture of the surface is only eight feet long and four feet wide, but enlarges as one descends, being bell-shaped. It put me in mind of entering the cupola or dome of the Capitol at Washington, at the top and descending to the floor below. One would get this impression on looking upward, it being nearly circular and gradually narrowing from the floor to the apex. Bones of a large variety of animals are strewn around, which probably stumbled into this fearful pit years and ages ago. Buffalo heads, and those of elk, deer and antelope are numerous, while bones of smaller ruminants, carnivora and rodents are strewn around. Bones were also found supposed to be those of human beings, but in fragmentary sections. Professors Darwin, Cope, Leidy, or an Agassiz, might possibly classify them, and give them lockjaw-contracting, unpronounceable names. But as our party could not be charged with profound erudition, and were utterly innocent of many of the "ologies," we didn't attempt it. The formation throughout the interior of the cave is cretaceous, or lime rock; but near and at the surface the formation is granite, gneiss, conglomerate and sandstone. The stalactites are opaque crystallizations, some of them being dense and hard, and when struck together give off a metallic sound. Others are soft and chalky, and at the pendant extremities of the consistency of moistened gypsum.—*Cor. Grand Rapids, Mich., Eagle.*

Mementoes of Bygone Black Hills Miners.

Mr. Witcher gave us an interesting account of the evidences recently found that men had gone into the Black Hills mines years ago, but never came out of them. Such accounts have been published in the Black Hills papers, but never elsewhere. In Rutabaga gulch, between Deadwood and Bald mountain, an old tunnel has been discovered, 30 feet into the side of the gulch, evidently made years ago. About 40 miles above Deadwood an ancient stone cabin has been found, and evidence that it was built by a party of brave adventurers, who, satisfied of the richness of the country, boldly penetrated into the wilderness, braving the danger from Indians and the severe winters, and falling victims, most probably, to the former.

In other places broken picks have been dug up, from an evident burial of many years. The remains of what was evidently a log harricade have been found, the logs and trees in the vicinity being filled with leaden bullets; while behind the harricade were the skeletons of two men with bullet holes in the skulls. These are believed to be the skeletons of white men who attempted to defend themselves from the Indians, but fell in the defense. Near the stone hut is a rock on which is chiseled "1852," and a portion of a memorandum book was found with the date 1852 still legible upon it, but with the other writing defaced and erased by time.

In excavating for a theater at Deadwood a few weeks ago the diggers unearthed a bottle of painkiller six feet below the surface, and came upon a place where there had been a fire at the same depth. Broken pickaxes and hatchets were also found there. Old mines have been found, where claims had evidently

been worked for some time, and in some places new mines suddenly run out, giving evidence that parts of them had been worked by somebody in the distant past. There are trails of trees having been blazed, and these blazes show evidence of having been made as long ago as the date above given, or thereabouts. Other striking proofs are found of some civilized people having 20 or 30 years ago known something of the valuable mineral deposits of that country, and having, "in the mad pursuit of wealth," gone there to unearth the treasures, and lost their lives in doing so. Certain it is that they never came out. Swift and sure the Indians swooped down on them, and left none of them to tell the tale, while the imperfect relics and marks of these expeditions alone point to the fact that these men were here, and that the Indians wiped them off the face of the earth, and for almost another generation kept the secrets of the hidden treasures locked up in the then almost impenetrable wilderness.—*Sioux City (Ia.) Journal.*

Academy of Sciences.

At the last regular semi-monthly meeting of the California Academy of Sciences, several donations of ores were reported from different citizens, the most noteworthy being some tin ore from San Bernardino county, presented by the Hon. C. Cole, and some copper slag by Thomas Price, metallurgist. This latter was found in Alaska, and is supposed to be the refuse from some ancient copper smelting by Indians or Russian trappers. Rev. Dr. Scott donated some Swiss relics, found in the lake dwellings. Fish Commissioner B. B. Redding presented to the Academy a fish resembling the skate, which he had received from A. W. Bush, of the Sandwich islands, where the fish is found. Even there it is quite rare, and the Kanakas have a superstition that it never comes inshore unless to die. It is only caught when close to the shore. The species of the fish is unknown. The specimen will be examined, and if no determination is arrived at it will be sent to the Smithsonian Institute for classification.

The Academy had on exhibition some elegant geological and topographical atlases to accompany the report of the geological exploration of the parallel of latitude, Clarence King, geologist, in charge.

Dr. Gibbons made a few remarks on the movement of atmospheric currents as illustrated by balloon ascensions. The gentleman said that the ocean breeze, which brings us the fog and moisture, is very low, above it is a series of variable currents, constantly shifting. Still above these, say at about 3,000 feet elevation, a steady belt exists, continuing for a long elevation. He had not looked into the matter very closely, but would continue his investigations and give the result to the Academy.

A gentleman inquired about the habits of shad on this coast as compared with the habits of those on the Atlantic coast. Fish Commissioner Throckmorton replied that the salmon invariably returns to the place of its propagation, and that on the Atlantic coast the shad does likewise. On this coast, however, the shad seems to have taken a new departure. Since 1870, 350,000 shad have been propagated here, chiefly near Tehama, and since 1870, shad have been caught along the coast from Wilmington to the Columbia river. This strange freak of the shad in abandoning his natal place is laid to the herring, from among whom the shad is frequently taken. The herring invades the shad from the path of his forefathers. He seems to have such an influence over him—his companionship seems to be so attractive—that the patrician shad willingly renounces his birthplace and travels about the ocean with schools of plebeian herring. The shad of the Atlantic coast always makes his pilgrimage to his birthplace.

REPTILES AND INSECTS IN AUSTRALIA.—The reptiles are really beautiful—crocodiles in the north and snakes, lizards, scorpions and centipedes in the south. I shall not readily forget the sensation I experienced when one night a huge black centipede, eight inches long, crawled upon my neck with his horrible 64 legs and made his way to my feet leisurely much to my disgust, and though he was probably only a few seconds I thought him slow. He is in the museum at Adelaide, with all the whisky he can drink. Insects are wonderfully prolific—mosquitoes and flies being particularly abundant. The native children are sometimes hardly recognizable, so completely are they covered with flies, filling their eyes, noses and mouths. When eating, it requires dexterous maneuvering to get a piece of meat into one's mouth without its complement of flies. Spiders are very common, as also are ants, the tarantula being the most formidable of the former, and the bulldog ant the worst species of the latter. These ants are an inch or more in height and about two inches long. They all fight fiercely, and their sting is not at all to be desired. They catch hold of your skin with their nippers, bend the body under like a scorpion and put the sting gently in, leaving the venom and sometimes the sting itself. When camping near a nest of them, we generally thrust a firestick in the hole, which has the effect of keeping them at home.—*Lecture by Jesse Young, the Explorer.*

THE Prescott Enterprise says that the trade of Arizona now amounts to \$4,500,000 per year and that it is increasing rapidly.

MECHANICAL PROGRESS.

Collapse Cured by Corrugation.

It is a quarter of a century since a corrugated form for boiler-flue tubes was first proposed. Then the advantage of corrugation was claimed to be in the increase of heating surface, but now the idea of corrugating furnace-tube plates has occurred to many engineers, both with a view to increase the efficiency and extent of the heating surface, as well as to increase the collapsing strength of the tube. The great interest taken by engineers in the results of the tests recently undertaken by the Leeds Forge Company, in England, for the purpose of ascertaining the relative strength of plain and corrugated tubes, shows that the time is ripe for the introduction of a strong form of tube, and if the corrugated tube answers as well as it promises to do, it will be very extensively used, especially for marine boilers.

The great strength or stiffness of the corrugated tube to resist collapse is due to the arched form of each corrugation resisting local distortion, and should local distortion arise, the depth of the beam, regarding the distorted arc of the tube as such, due to the corrugation, strongly resists any further deflection. The corrugated is stronger than the plain tubes for same reason that an L or T iron ring is so much stiffer to resist collapse than a plain ring of the same thickness of metal. The stiffness is, of course, additional to that imparted by the circular form of the tube, which the corrugated possesses in common with the plain tube.

What the actual collapsing strength of tubes may be of different thickness and diameter and of different degrees and proportions of corrugation, can only be determined by experiment. They are, however, immensely stronger to resist collapse than plain tubes, and there does not appear to be any reason why they should ever be made over three-eighths inch thick, which will be a great advantage when tubes as usually made at present have to be made nine-sixteenths inch thick to conform to certain rules.

The only way at present to make a satisfactory job of the corrugated tube appears to be to make it of one length of plate circumferentially, to weld the longitudinal seam and then corrugate the tube by rolling, swaging or hydraulic pressure. In tubes about three feet in diameter, the requisite length can only be obtained by arranging the plate so that the distorting action of the corrugating process is brought to bear upon it across the fiber, or in the manner in which the plate is least able to bear it. Even best Yorkshire plates, as usually made, cannot be expected to stand this severe test without considerable risk of failure. This is probably the reason why the attempts to make corrugated tube plates have hitherto failed, and the form of the well-known "bowling hoop" appears to be an outcome of the idea of making corrugated flue tubes.

What was required to insure the successful manufacture of these tubes was a plate that would show an elongation across the fiber greater than only 50% of that along the fiber, and with an ultimate breaking strength crosswise more than only 90% of that lengthwise, which may be taken as the average performance of best Yorkshire plates. The Leeds Forge Company have apparently succeeded in making their plates in such a manner that they are able to bear with tolerable certainty the corrugating process after they have been welded into rings. Thus one advantage for the user of corrugated tubes is that he is pretty sure not to be troubled with blisters making their appearance after the tube has been at work awhile, as any lamination is sure to be brought to light by the operation of corrugating.

Forging and Tempering Iron and Steel.

The forging and tempering of iron and steel can be greatly enhanced, according to Edward Blass, of Cleve, Prussia, by dipping the metal, in whatever form, in fused salt. This dipping in salt is also well adapted for annealing steel without the oxidation of the surface. If the metal be rusted, it must be allowed to remain some time in the bath. Borax can with good effect be mixed with the salt. Metal "purified" by such an immersion is very susceptible to galvanic depositious, and can easily be coated with copper, zinc, tin, nickel, silver, etc. For iron in the spongy or powdered state as obtained from the reduction of the ores, the salt bath is especially adapted, for it augments the combination of the particles by making their surfaces free from impurities. To prepare the bath for an application as here proposed, the salt must be fused in a puddling furnace, and the iron sponge, with the addition of a flux, be added in small quantities, so as not to vitrify the salt. The iron is left in the furnace till the flux has combined with all the impurities and formed a slag, whereupon the iron is taken out and forged together. While the iron is in the furnace it should be constantly covered with the salt, so that oxidation be prevented. For the hardening of iron the salt is fused in a convenient vessel and the object immersed, and from time to time a small quantity of ferro cyanide of potassa added, one pound or two pounds per 100 pounds of iron. The articles, according to their thickness, are permitted to remain from five minutes to 30 minutes in this bath, and are

then plunged in water containing, in 100 parts, one part of hydrochloric acid, five of wine vinegar, and one of salt. If the objects are to have a silver luster, they should be immersed for a few minutes in a mixture of three parts of wine vinegar and one of hydrochloric acid.

Hard and Soft Solders.

Edward Kirk, in his writings "on the founding of alloys" for the *Iron Age*, gives the following formulas for hard and soft solders: The following metals and alloys are usually used as solder in the art of hard soldering:

Fine or pure gold, rolled or beaten into sheets, and into shreds, or small pieces, is used as the solder for soldering chemical vessels made of platinum.

Silver solder, composed of 4 parts silver and 2 parts yellow brass is much used for hard soldering. The brass is used in this solder, so that the operator can tell when the solder is fused by seeing the blue haze caused by the burning of the zinc. This solder is either rolled into thin sheets, and cut into small bits for use, or is granulated while hot.

The gold solder, the composition of which is given under the head of gold alloys, is rolled into thin sheets and used for soldering gold alloys. Gold soldering is generally done with the blowpipe, as the work is seldom large enough to require the brazier's hearth.

Pure copper, in shreds, is sometimes used for soldering iron.

Spelter solders, granulated while hot, are used for soldering iron, copper, brass, gun metal, German silver and sometimes for gold and silver alloys.

As a cheap substitute for silver solder the white or button solders are commonly employed for the white alloys, such as German silver, gun metal, etc.

The flux most generally used in hard soldering is borax. In fact there is very little hard soldering done without the aid of this flux. It is generally granulated, and used in the dry state for large or heavy work, and for small work it is generally used in solution with water.

The soft solder used by plumbers, called sealed solder, is composed of 2 parts of tin and 4 parts lead. This solder melts at about 450° Fah.

The common solder used by tinsmiths is composed of 4 parts tin and 2 parts lead. This solder melts at about 350° Fah.

The bismuth solder is composed of 7 parts bismuth, 5 parts lead and 3 parts tin. This solder melts at about 225° Fah.

All the tin and lead solders become more fusible the more tin they contain. Thus, 1 part tin and 10 parts lead melt at about 550° Fah., while 6 parts tin and 1 part lead melt at about 375° Fah.; and all the tin, lead and bismuth solders become more fusible the more lead and bismuth they contain.

The fluxes used in soft soldering are borax, sal-ammonia, chloride of zinc, common resin, Venice turpentine, tallow and sweet oil. The most commonly used for ordinary work are common resin and chloride of zinc.

FINE METAL WORKING.—A monument in fine art metal work has just been erected in St. John's church, Priess street, Edinburgh, to the memory of Dean Ramsay. The monument, which is of bronze, silvered and gilt, consists of a projecting canopy, surrounded by a series of enameled plaques, representing the thistle and the rose, and alternating with clusters of amethysts and crystals. The crest is of silvered foliage and enameled daisies; while the canopy is surmounted by a cross, enriched with amethysts and crystals, supported by shafts bound with traceried fillets, and the base consists of an inscription tablet, with a border of enameled forget-me-nots, onyx stones and pebbles.

GUNS.—The heaviest guns in the American navy are 15-inch smooth bores, weighing 42,000 pounds, with a solid projectile of 440 pounds, a shell of 352 pounds and an initial velocity at the muzzle of 1,560 feet a second. The English muzzle loader of 80 tons costs \$50,000, the 100-ton \$50,000, and Krupp's breech loader, exclusive of the carriage, \$100,000. Not long since Herr Krupp proposed to lend the English government a gun for \$75,000, but he required an order to be given, in case of success, for guns to the extent of \$10,000,000. These terms were held to be much too onerous and the offer was declined.

INTERESTING EXPERIMENTS IN STEEL PRODUCTION.—The Belgians have been credited with the ability to produce a larger quantity of steel in a given time than can be accomplished in England, but experiments recently made at the Barrow Steel Works show that the Belgians have something to learn yet, as it is claimed the greatest output of steel was made for a given amount of producing machinery ever yet recorded. Two 12 hours' turns were taken, and in the Bessemer department 479 tons, 14 cwt., 3 qrs. of ingots were made by 77 blows out of six vessels in three pits.

GERMANY AND HOME INDUSTRY.—News comes from Berlin that the German government has given a secret but general order that all articles used in the government establishments must in future be of home manufacture. This command applies, among other items, to steel, files, iron, and even coals.

SCIENTIFIC PROGRESS.

Sulphur in Organic Substances.

The following account of a new method for the estimation of sulphur in organic and inorganic substances, devised by Messrs. M. W. Iles and C. Fahlberg, of Johns Hopkins University, is sent to the *Journal of Chemistry* by the authors. The method may be briefly stated as follows: From 25 to 50 grammes stick potassa is fused in a large crucible, preferably a silver one; to the partially cooled mass is added from 0.1 to 0.5 gramme dry substance to be analyzed. Heat is now gently applied until all the bubbles have disappeared, and the liquid has assumed a quiet fusion, and there is noticed upon a marked increase of heat a slight vapor. This operation is an important one, but generally does not take more than from 15 to 25 minutes.

The cooled mass is dissolved in water, transferred to a beaker diluted, and filtered. To alkaline solution is added 30 to 50 cc. bromine water. The solution is then stirred, and acidified with hydrochloric acid. Heat is now applied until the liberated bromine has been expelled. To the hot solution barium chloride is added, and the amount of barium sulphate estimated in the usual manner.

It will be seen from the above statement that the operation is an extremely simple and expeditious one, and that it has a decided advantage in requiring no complicated apparatus.

The fusion with potassium hydroxide has for its object the complete transformation of the sulphur, both in organic and inorganic bodies, into a sulphite. The potassium sulphite is converted into potassium sulphate completely by the liberation of both oxygen and bromine *in statu nascendi*. The accuracy of this method has been verified by a number of quantitative determinations, both of inorganic and organic bodies; for the latter purpose it has been found extremely valuable.

THE HUGHES TELEPHONE.—The eminent inventor of the well-known Hughes type-printer, says the *American Manufacturer*, has made the startling discovery that certain unhomogeneous conducting substances placed in circuit with a battery possess the property of converting sonorous vibrations into undulatory currents of electricity, by which not only can notes and articulate speech be transmitted to a distant telephone placed in the circuit, but sounds so minute as to be otherwise inaudible can be magnified into loud noises. Of all the marvels connected with telephonic electricity, we have no hesitation in saying that Prof. Hughes' discovery of the sensitiveness of certain compound structures or unhomogeneous substances to minute vibrations is the most marvelous of all. It opens up a vast field of philosophical inquiry and places in the hands of the physicist a detector of sounds and of mechanical vibrations so small as to be altogether unsuspected. It, in fact, gives to him the means of constructing instruments which will be to the ear what lenses and microscopes are to the eye, and at the same time as a telephonic transmitter, it is an improvement upon Prof. Bell's telephone, transmitting louder and clearer articulation. But the most extraordinary part of Prof. Hughes' discovery is the ridiculous simplicity of the apparatus employed; a few French nails, a few sticks of charcoal, a tube or two containing powders, a little sealing wax and a few pieces of wood, and any boy can in a few minutes construct a transmitting telephone surpassing in sensitiveness the beautiful instrument of Prof. Bell, which it does not altogether supersede, for that instrument is still employed by Prof. Hughes as the receiver.

BALLOONING.—Mr. W. B. Woodbury has recently proposed an ingenious idea for taking photographs of an enemy's works from a balloon, without necessitating the presence of an aeronaut in the car. Electrical wires are run along the cable by which the air ship is held captive. Instead of a car a box is provided, inside of which another box is pivoted, so that it will keep horizontal. In the inner box is the photographic apparatus, and over the lens is an ebonite shutter, moved by the current, to open or shut instantaneously. There is also a sensitized tissue, on rollers, in rear of the lens, which is operated by clock-work, also controlled by the current. When the balloon is elevated to the required height, the lens properly focused and the tissue in position, the shutter is set in motion by the current, giving instantaneous exposure. A photograph is thus obtained, and, by further controlling the clock-work, fresh sensitized surface may be exposed and additional images taken.

ENTOMOLOGICAL.—Prof. C. V. Riley, late State Entomologist of Missouri, has been appointed entomologist to the Department of Agriculture of the United States. He has accepted the position, and will shortly remove to Washington City. This is one of the most gratifying announcements we have lately had the pleasure of making. Prof. Riley is the leader in what may be called the industrial development of entomology, and his service to the country in his new field of work will be proportionally to its needs, which are almost incalculable. We are glad of the appointment and acceptance.

The Brain of the Chimpanzee.

Dr. E. C. Spitska makes a detailed report of the autopsy of the dead chimpanzee, recently made at the New York Aquarium before many distinguished surgeons and scientists of that city.

Species, *Troglodytes niger* (chimpanzee); sex, male; age, about two years. All the organs greatly resemble those found in the human race. When the brain was removed all present were struck by its being almost indistinguishable from that of a human infant, especially at its base. The cerebrum was richly convoluted, and overlapped the cerebellum about one-third of an inch.

It had also the same lobes, and was as rich in convolutions as the brain of a Bechuana, possessing also a well-developed island of Reil. Careful examination, however, showed that it had also an operculum of the occipital lobe, which is not found in the human subject. One of the most interesting features of this brain was the absence of a trapezium, and the presence of the olivary bodies. Now, although a rudimentary olivary body exists in the lower mammalia, yet it causes no perceptible prominence of the medulla, and such a prominence is first indicated in the baboon. But in this chimpanzee it was as full and large as in the human race, a fact in full accord with the high development of the lateral lobes of the cerebellum, for the olivary bodies keep pace in development throughout the animal kingdom with the development of the cerebellar hemisphere.

The island of Reil, whose relations to the higher faculties are strongly documented by the prevailing physiological belief that is subservient to the faculty of speech, was also in this instance large and well developed.

ANOTHER FERMENT.—A chemical question which has caused much discussion for years, now seems in a fair way to be solved by the microscope. It is a well-known fact, says the *Journal of Microscopy*, that nitrogenous substances in soil, or under proper conditions elsewhere, have their nitrogen rapidly oxidized to nitric acid while undergoing decomposition. Numerous explanations of this action have been offered, but thus far all have failed to give entire satisfaction. The latest results seem to indicate that a ferment takes place in the operation. The details of the experiments are not at hand, but Schloesing and Muntz, followed by other investigators, have found that those agents, such as chloroform or heat, which kill or prevent the growth of plants, also arrest this action, and that a soil in which all organisms are destroyed by heat will not cause oxidation of this kind, so long as it is protected from germs, but the addition of a very little common soil will start the process. It does not appear that the specific plant engaged in this important operation has been isolated as yet. If there really is such a ferment, it must be widely distributed and of vast importance.

MICROSCOPICAL CONGRESS.—The *Journal of Microscopy* says that it is proposed to hold a Microscopical Congress next August at Indianapolis, at which it is expected that all the prominent microscopical societies will be represented. This Congress, if it should meet with general support from the microscopists of the country, cannot fail to effect much good. It ought to bring together all the prominent workers in the country, make them personally acquainted with each other, and develop by discussion many points of great interest. We are satisfied that many of the discussions which have stretched to great length when conducted by correspondence only, might have been settled satisfactorily by a very short personal interview. We are happy to say that the meeting promises to be largely attended. Particulars in regard to the arrangements which have been made, may be found in a circular which may be had by addressing Dr. W. W. Butterfield, Indianapolis, Ind.

ANTHROPOLOGY.—We receive the first number of a quarterly magazine called the *Antiquarian*. It is to be devoted to early history, ethnology and archaeology. The editor is Rev. Stephen D. Peet, of Ashtabula, Ohio, corresponding Secretary of the American Anthropological Association. The first number promises well for the future of the publication. Its leading article is on the ancient garden beds of Michigan, by Bela Hubbard, and it is fully illustrated by diagrams. Another paper is on mounds and earthworks, relating in part to the mounds in Washington Territory. We have no doubt the *Antiquarian* will be highly esteemed by all anthropologists as a medium for intercommunicating the results of their studies. The publishers are Brooks, Schinkel & Co., Cleveland, Ohio.

THE EASIEST WAY TO DROWN.—Dr. R. S. Tracy, in the *Popular Science Monthly*, says that if death by drowning be inevitable, as in a shipwreck, the easiest way to die would be to suck water into the lungs by a powerful inspiration, as soon as one went beneath the surface. A person who had the courage to do this would probably become almost immediately unconscious and never rise to the surface. As soon as the fluid has filled his lungs, all feelings of chilliness and pain would cease, the indescribable semi delirium that accompanies anaesthesia would come on, with ringing in the ears and delightful visions of color and light, while he would seem to himself to be gently sinking to rest on the softest of beds and with the most delightful of dreams.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

BUTTE.

BIG GOLD BARS.—*Mercury*, June 7: In our issue of May 24th we spoke of having seen at Rideout, Smith & Co.'s bank a bar of gold, containing \$32,000, from the Spring Valley mining and irrigating company, of Cherokee. On Wednesday this same company sent down to the bank a bar which contained \$21,000, making \$53,000 they have sent down within two weeks.

NUGGET FOUND.—A lump of gold taken from the "top dirt" of O. P. Powers' mine, across the river, was left at the bank of Rideout, Smith & Co., a few days ago. It contained between \$3,000 and \$4,000 gold of the finest quality.

CALAVERAS.

AT WEST POINT.—*Chronicle*, June 8: Needhardt had 25 tons of quartz crushed that yielded \$1,500; \$60 per ton. Andy Shenake recently discovered a vein four feet wide, that prospects \$30 per ton; 25 tons of Lone Star rock paid \$30 per ton. Rose & Porteous are putting up a mill on the Bummerville mine. Champion, taking out rock.

NEVADA.

THE BYRNE MINE.—*Transcript*, June 9: We are informed by Superintendent R. M. Fryer, that this company will get under full blast inside of 12 days. Three hoisting works will be erected on their claim at Gold Flat, and a mill will be put up during the present season at some point convenient to the different localities where the ledge is being developed. A large force of men will find steady and lucrative employment as a result of this new and important mining enterprise. Previous developments and present indications are said to fully warrant the beginning of operations on the extensive sale above outlined, and the management have the utmost confidence in the future greatness of the Byrne. The gentlemen who are engaged in opening up these extensive claims are among the most experienced mining operators and owners on the coast, and do not belong to the class who ignore the words of Davy Crockett, "Be sure you're right, then go ahead."

VERY FAIR.—A clean up of 84 tons of quartz from the Deadwood mine, near Nevada City, yielded 150 ounces of gold, and average of \$30 per ton.

WATT GRAVEL MINE.—Shaft down 422 feet, and drift run 260 feet, the men working in fine-looking gravel, where they have got a number of colors to the pan. They are at present from 30 to 40 feet above the bedrock, and will commence sinking again in about a week.

SAILOR FLAT HYDRAULIC.—On this claim, which adjoins that of the Blue Tent Co., they are using about 500 inches of water daily, and employing a force of ten men. The property comprises 600 acres, and is very rich, an average clean-up of \$6,000 being made every six or eight weeks. Three pipes will be used in the fall, instead of one as at present, thus increasing the yield in a like ratio. The indications of this mine are of most flattering character, and the good sized and frequent dividends it affords stamp it as a property of decided value.

BLUE TENT.—Under its present most excellent management this fine property is yielding at a most satisfactory rate. The company has had a long fight with formidable and often unforeseen difficulties; but their path to a great and lasting success now seems clear. A mint of gold will be washed from the old Blue Tent ground in the early future.

VARIOUS MINING ITEMS.—A strike of rich ore is reported in the Pittsburg. The Derbec continues to afford gratifying signs of large mineral wealth. From the shaft, 274 feet deep, drifts are being run in an easterly and westerly direction—the former having progressed 45 feet and the latter ten feet. The bottom of the shaft and both of the drifts are in the richest of gravel. On the Empire work is being pushed with no changes to note. The ledge is still very small all through the mine. The ground in No. 6 drift in the Rich Hill lode is a little more favorable.

INYO.

THE INDEPENDENCE.—*Independent*, June 8: The Independence tunnel and mining company, owning the Potosi series of mines, on the north side of Kearsarge Peak, has begun active operations. A few men have been put to work on the hill building cabins, opening trails, etc., preparatory to regular operations on the tunnel which it is proposed to run. To cut through all the company's own mines requires a tunnel 2,000 feet in length, beyond which are situated the Rex Montis and others. In prosecuting the work, Burleigh drills and all modern means of rapid work will be introduced and matters pushed ahead. When by the melting of the snow such work is practicable, a road will be constructed to the summit and the waters of the lakes thereon turned down the creek to furnish power for the mill, to be erected just below the mouth of the tunnel.

BEVERIDGE DISTRICT.—The new gold mines of this district, just across the Inyos and some 18 miles distant from here, are coming into high note, the outlook being second to none in the county. Parties just in from there confirm our

account given in detail some three weeks since, especially as to the number of ledges and the quantity of rich gold ore in sight. To the north of the Hughes, Porter & Co. mines there is a field known to be rich in gold ledges, and unoccupied, unless a recent Lone Pine party has made locations there. A mill is about to be erected in the district and a road built connecting it with Independence.

KERN.

AT THE BIG BLUE.—*Gazette*, June 8: Everything is going along as usual. At Mineral hill they are busy taking out rock and crushing it at the old Bull Run mill. J. W. Sumner has sold his mine on Mineral hill to D. E. Jones. At Keysville D. E. Lightner is still working away. He says the indications at present are flattering. At Erskine creek the Mitchells are still operating, and Moore, Black & Co. are preparing to build a mill on their lead.

SOLD.—G. P. Cornell has disposed of his interests in the Eclipse and Lee mine near Tail Holt, to a party of San Francisco gentlemen who will run it themselves. They have removed the 10-stamp mill and will use the 5-stamps remaining for crushing rock.

SHASTA.

COPPER CITY.—*Reading Independent*, June 6: W. H. Dunn sent us some fine specimens of ore from the Northern Light mine, at Copper City. They have found a very rich ledge. Superintendent Boylon, of the Donkey mine, reports everything fine in the district. Their ledge is five feet wide on the 200 level, and it improves in richness as they go down. N. A. Peckham has sold his mine, on Whisky creek, to Hull, Bickford, Grotenfend and Stroud, for \$4,000.

IRON, MARBLE AND GOLD.—There are iron and marble mountains near McCloud river, and the Central Pacific will probably secure the last mentioned. Patents for two iron mines have already been taken out of the Shasta Land Office. Dunham & Co.'s hydraulic and drifting mine, Igo, 12 miles from Shasta, 100 acres, has a channel from 400 to 600 feet in width, and pays between \$2.50 and \$5 per cubic yard.

SIERRA.

ORIENTAL.—*Mountain Messenger*, June 8: Work on this claim, situated near Alleghany, is being pushed forward as rapidly as possible and the hoisting of ore has been commenced. It is thought that, in a few days, 15 to 20 tons per day will be brought to the surface. There is now in sight, between the 300 and 400 levels, 16,000 cubic feet of pay ore. By allowing 13 cubic feet to the ton, they now have on hand and in sight, 1,230 tons of ore, and they will have from 500 to 600 tons of that on the dump before July 1st. They are raising on the vein in the main tunnel and in a few days will be to the point where was found the rich quartz.

SAVAGE.—Active work has been commenced on the Savage mine, near Milton, on the ridge above the Pliocene. A Virginia City company owns the ground and will put down a shaft this summer. No one doubts their striking a fine pay channel.

GOLDEN STAR.—On this claim they have developed a channel, or rather two channels, several hundred feet wide, with splendid gravel in each and of indefinite length. The company is working about 35 men, and taking out nearly gold enough to pay expenses at present. They are short of water, which is the only thing that prevents them declaring dividends monthly. A 75 breast of rich gravel was lost, last week, by a cave. Contrary to the opinion of several experts, the mine is now demonstrated to be an extensive one.

PLUMAS.

THE GREEN MOUNTAIN.—*National*, June 8: This mine is showing better and better as the work makes developments. The lower level shows an improvement in the quality of the quartz, which is of first-class importance as it proves the "staying" powers of the mine. The shipment for the month of April was \$9,000.

PLUMAS NATIONAL MINE.—This company are now employing 50 men, and the works and mine are in splendid condition. The upper "stopes" show decidedly well and continue to yield favorably. A new level is being opened, with three shifts of men running day and night. The pay chute of quartz should be reached in a few weeks, and it will probably show an improvement in quality of rock over that above. The mill is running constantly with excellent returns. Soda creek begins to show signs of becoming one of the lively mining camps of Plumas, and another mill or two will probably be put up before fall.

MINING NOTES.—The big pipes are all at work, and the miners busy about La Porte. The present water season is certainly a favorable one, and the miners will make a harvest. The Hungarian company have plenty of water and the pipes are running steadily. The Bell's Bar company are hard at work, and think they will get hedrock in a short time. Through the difficulties that have arisen between the owners of the Franklin, another good mine is doomed to be idle for some time to come, at least, to the detriment of many good square men, who have invested their money with the expectation that it would be a paying enterprise.

SISKIYOU.

MINING ON THE KLAMATH RIVER.—*Yreka Journal*, June 5: Shortly mining on this stream will be lively, with the prospect of much gold being taken out this season. Pacific company, working the bed of the Klamath at mouth of Humbug, are running two drifts, one up the stream and the other towards Humbug creek,

under the river, and have already taken out very good prospects. The Empire quartz mining company are also putting up a new mill, Mr. Hopper having already commenced the wood work with a couple of carpenters assisting, and the iron work is now being hauled to the locality from the foundry in this city. In about another month Schnackenberg and Lewis will have the road completed, so that by the time the mill is completed the company will be ready to haul quartz from the mine for crushing. The Centennial Bar claim owners will be ready for washing pay dirt this week, and expect to realize a rich reward for their perseverance and industry in opening this claim. Other parties further down on the river are also making preparations for a good season, while down at Humburg Bar, more mining will be done than ever before, giving an abundance of work for a large mining population along the river all the way from Humbug to Humburg.

TRINITY.

TRINITY CENTER.—*Journal*, June 8: Never were prospects better in the northern part of this county than at the present time. Farmers have the assurance of a more than ordinary crop and miners are at work with a full supply of water, which will continue a long time yet. Business about the town of Trinity Center is brisk and all Trinity valley is happy and content. The Altoona quicksilver mine is in good shape to make a large and profitable run this season. Owing to the extreme high grade of the ore, the metal can be produced here more cheaply than at any other mine in the State. In so far as they supply the mines in the vicinity, this company have also the cost of transportation in their favor.

DEADWOOD AND INDIAN CREEK.—From the former of these places, mining reports are of the most cheerful kind. The Johnson mine, on Indian creek, is also turning out well; ore rich and profits satisfactory.

Nevada.

WASHOE DISTRICT.

CON. VIRGINIA.—*Gold Hill News*, June 12: On the 1950 level the west drift from No. 3 California winze has completed connection with the C. & C. shaft since our last report, giving excellent and much needed ventilation to that portion of the mine. The main south lateral drift on the 1850 level is in hard hasting porphyry, and the timbering of crosscut No. 3 is being pushed forward to completion. On the 1650 level the west crosscut from winze No. 1 continues in fine ore, and the winze being sunk in the west ore body is also still in good ore. The repairs to the main shaft of the mine are being urged forward as fast as unlimited men and means will admit of.

CALIFORNIA.—There are no important changes in any of the ore stopes or hearsts on either the 1600, 1650 or 1750 levels, all are looking well and yielding good ore. On the 1950 level the east drift has connected with the 1950 station of the C. & C. shaft, greatly benefiting the ventilation of all the lower portion of the mine, and enabling a much more rapid advance of the main south drift on that level.

SIERRA NEVADA.—The south drift on the 2000 level has reached the south line of the mine, at which point two crosscuts will now be run, one east and the other west, to prospect the ore vein.

BELCHER.—The main east drift on the 2360 level has reached a point within a short distance of where it was expected to strike the ore vein, and preparations are now being made to start a drift south on the west side of the ore vein.

OVERMAN.—The east drift on the 1600 level is steadily advancing, the face in dry vein porphyry. A drill driven to the westward from the bottom of the shaft to test the character of the ground, struck water, when the drill hole was immediately plugged up and an advance in that direction stopped.

LADY WASHINGTON.—The east and west crosscuts on the 1150 level have reached the east and west walls of the ore vein, which at that point is 170 feet in width, solid and well-defined, carrying small streaks of rich ore.

CALEDONIA.—The north drift on the 1600 level is steadily advancing, the face in fine ledge matter, and the flow of water steady, strong, and gradually increasing.

CON. IMPERIAL.—The east drift from the 2400 station of the joint Alpha winze is advancing, the face in vein matter of a favorable character. The north drift from same station, running in Alpha ground, is in a distance of 80 feet, the face in quartz, clay and porphyry mixed.

JULIA CON.—No. 1 crosscut 100 feet south of the 2000 station is in a distance of 36 feet, the first 20 feet having passed through a mixture of clay and porphyry, and the last 15 feet being a mixture of porphyry and quartz of a lively, healthy look. Crosscut No. 2 was in 34 feet, the entire formation from the start being vein matter of the finest character, streaked with quartz, which has every appearance of forming an unbroken body of ore at almost any moment. The dip of the clay west wall is that of the genuine Comstock, and the stratification and stringers of quartz both show a vastly improved condition of the vein over what it was, even 200 feet farther south on the level above.

SAVAGE.—The east drift on the 2100 level is steadily advancing, and is now in a distance of 100 feet from the station, the face being still in porphyry of a favorable make. The east drift on the 1640 level is being pushed steadily forward, the face still is solid quartz and low

grade ore, showing occasional spots of very rich chloride ore. The quartz and ore penetrated by this drift is now over 100 feet in width, and there is no sign of any east wall. The distance separating the face of this drift from that of the Sutro tunnel advancing from the east, is not far from 120 feet.

OPHIR.—Yesterday members of the press were allowed to visit and reportorially examine the ore development in the winze below the 1900 level, about which such contradictory and undesirable stories have been told of late. Representatives of the *News* and also of the Virginia papers have taken a square look at it, and also took all the samples for assays they saw fit. At the 2000 level a station is opened, and a drift west commenced to connect with the main drift on the 2000 level, which is coming east from the main incline to connect with this winze. About 20 feet remains to be drifted in order to complete this connection. With the exception of the first 18 feet, the winze aforesaid has been continuously in ore with a partial interruption from porphyry at one or two points, and the station at the bottom, which is not yet timbered, shows a width of 19 feet of excellent milling ore with the probability of several feet more. The average assays of this ore are very good, running from \$50 to \$300 and upwards to the ton.

YELLOW JACKET.—The north winze below the 2200 level is down 371 feet on the slope of the ledge, and 30 feet more will carry it to the 2400 level. The new shaft is down 1501 feet, bottom in hard, dry porphyry.

SILVER HILL.—The south lateral drift on the 800 level is steadily advancing, the face in very favorable quartz.

JUSTICE.—The prospecting drifts east and south on the 1300 level continue to show well, and promise the development of considerable bodies of good ore when everything is ready for its extraction.

GOULD & CURRY.—Sinking the main incline is being pressed ahead with all the force possible, the air at the bottom being very hot and the rate of progress thereby much impeded.

ALTA.—The north and east prospecting drifts on the 1350 level are being pushed rapidly ahead, a large portion of the vein being laid bare ready for crosscutting and the extraction of ore for milling, whenever it is desirable to do so.

BULLION.—The north drift on the 2000 level is steadily advancing, the face in hard, dry porphyry and clay mixed, with streaks and spots of favorable quartz. The east drift on the 1840 level is also advancing, the face in favorable vein material.

MEXICAN.—The joint east crosscut on the north line, on the 1600 level, is being steadily advanced at the rate of three feet per day.

CROWN POINT.—The south drift on the 2300 level, running to connect with the north drift from the 2360 station of the Belcher drain shaft, is being pushed ahead with extraordinary vigor, having advanced 56 feet last week, or at the rate of eight feet per day.

UNION CON.—The joint east crosscut on the south line of the mine is advancing rapidly, the face in hasting porphyry.

HALE & NORCROSS.—The pumps, working in conjunction with those of the Savage, are steadily gaining on the water, which is now down 50 feet below the 2100 station.

CHOLLAR-COMBINATION SHAFT.—Sinking the Combination shaft is going ahead at the rate of three feet per day, the rock in the bottom blasting out quite hard and the flow of water being still about 42,000 gallons per day.

SUTRO TUNNEL.—Total length of tunnel, 19,847 feet. Face of header in dry, hard ledge matter, principally porphyry, with streaks of quartz.

LEVIATHAN.—The face of the main drift east on the 765 level is in a mixture of porphyry and quartz, and the ore vein is evidently not far away.

BELMONT DISTRICT.

MINES ABOUT TOWN.—*Courier*, June 8: Work continues to be actively pushed on the series of mines in this district and with steady improved prospects. The machinery is in good order and running smoothly, and ore extraction may be expected to begin in good earnest before long.

THE GILA MINE.—The stopes are looking remarkably well and turning out very good ore in larger quantities and of a better grade than ever before. The mill, until yesterday, has been running on custom rock; commenced on Gila ore, and from this time the mill will run steadily upon it, having now at the mill nearly 400 tons, with a large quantity on the dumps and the stopes looking well, with the promise of a large quantity yet to take out. Bullion shipments for May, \$7,266.40.

WESTERN NYE.—Concerning the mines in the western part of Nye county, we receive the following information: The Alexander company, at Grantsville, will soon commence erecting their new mill, which, when started up, will materially reduce the cost of turning the ore into bullion. At present the expense of hauling ore to the mills at Ellsworth and Ione considerably lessens the profits. The company is running a chute to connect the upper and lower tunnels. As soon as the connection is made they will have better air in the mine, which will, of course, increase their facility for the extraction of ore in sight.

DOWNIEVILLE.—Work in the mine of the Downie Bros. is being pushed vigorously along. They are taking out large quantities of rich ore and there are several hundred tons on the dumps, waiting the firing up of the furnaces.

These mines are looking splendid and seem to be one vast body of ore. The furnaces are nearing completion and will soon be adding its quota of bullion to the output of Nye.

ELLSWORTH.—This mill is shut down for repairs. It will start up on ore from the Alexander as soon as things are in running shape again.

LODI.—The mines are producing quantities of rich ore, which keeps the furnace steadily going.

IOSE.—The town is quiet. The mill is running on ore from the mines at Graustville.

CHERRY CREEK DISTRICT.

STAR MINE.—*Independent*, June 8: The shaft on this mine is now down 115 feet below the 360 level. Drifting on the 460 level will commence immediately. The usual number of men are employed on the mine, and sufficient ore is being taken out to run the mill. During the past month the Star company has disbursed the sum of \$25,000, including \$11,000 for labor at this mine and mill.

THE MARY ANN.—Work here has been temporarily suspended. The contract made in February last, whereby certain portions of the Mary Ann mine were to be prospected on the condition of the man receiving their board, whether ore was discovered or not, but \$4 per day in addition thereto in case ore was discovered, expired on the 18th ult. The body of ore in sight is now more promising than at any time heretofore. The only reason the return from the ore crushed at the Geneva mill was but \$47.33 to the ton was from a want of being properly sorted.

EUREKA DISTRICT.

MINING NOTES.—*Sentinel*, June 8: From 12 to 20 carloads of crude bullion, worth from \$16,000 to \$30,000, are shipped from Eureka daily. The Atchinson Union mine, recently discovered, is pronounced to be a continuation of the McCoy hill vein. The croppings are wonderfully rich, assays running into the thousands. The Williamsburg shaft is down 150 feet, and the bottom is in ore. Considerable sorted rock is being engaged for shipment by Salt Lake buyers. The bottom of the winze at the Bald Eagle is in clay and ledge matter intermixed with streaks of oxide of iron, and there is every indication of the proximity of a large ore body. Considerable ore is being shipped from the Barton mine to the Richmond reduction works. The bottom of the winze from the lower level of the Bald Eagle is in clay and ledge matter, with all indications favoring an ore development close by. The force at the Kit Carson are doing some good work, straightening up the shaft, and getting the property in shape for future operations. An upraise above the 250 level some 80 feet from that point, in the Hamburg, has developed a handsome body of gray carbonate ore, rich in silver, and carrying from 50% to 60% lead. About 1,000 tons of ore have been broken down at the Geddes and Bertrand mine. It will run from \$100 to \$150 per ton.

JEFFERSON DISTRICT.

STARTING UP.—*Reveille*, June 7: The commencing of work on the Jefferson mine has tended to reanimate this old, and, for a long time, sluggish locality. When it became known that operations were to be resumed, many men applied for work, there having been but little for them to do for many months past. Jefferson has good mines, which were turning out much bullion a year or two ago, and it would be gratifying to see this state of affairs prevailing there once more.

LEWIS DISTRICT.

ORE STRIKE.—*Silver State*, June 8: A very important strike has been made in the Arthur mine in Lewis district. At a level started in the shaft at a depth of 85 feet from the surface, they have cut six feet into the ledge without any appearance of getting through it. This distance is in solid ore, which assays high in silver. We saw a specimen of the ore, in which there is a beautiful net work of antimonial silver wire, and for which specimen collectors offered \$20 at sight. The Arthur mine was discovered last winter, and is owned by Tom Ryan, the discoverer, Aleck Middleton and others. The Star and Grove mill is a success. The ores are worked up to 92% of their assay value.

SULPHUR AND CINNEBAR.—It is reported that cinnebar, containing a high percentage of quicksilver, has been found in the San Francisco Sulphur Company's mines at Rahhit Hole, and that the prospects are favorable for extensive deposits of the ore being found. We believe it is not unusual to find sulphur and cinnebar in the same locality.

OSCEOLA DISTRICT.

PROSPECTS.—*Independent*: The news from the gold fields of Osceola gives encouraging accounts of recent rich strikes of quartz in that district, and a big camp is likely to spring up out there during the coming season.

WARD DISTRICT.

BULLION SHIPMENTS.—*Ward Reflex*: The bullion shipments made from Ward for May do not come up to the estimates made at the first of the month, but two shipments being made—May 10th, \$10,400, and May 20th, \$11,822, making a total of \$22,222. Another shipment will perhaps be made in a day or two equal in amount to either of the shipments already made, which should be credited the month. This falling off is doubtless owing to the milling character of the ore put through the furnaces.

WHITE PINE DISTRICT.

THE KING'S COMPANY'S FURNACE.—*News*,

June 8: This furnace, which was to have started up this week, has been delayed, waiting the arrival of water tanks from below. In the meantime, Mr. Lyman is accumulating quite a supply of ore from the various mines around White Pine mountain, which will enable the furnace to make a profitable run. We understand that Mr. Thomas, the smelter, anticipates no serious trouble on account of the water supply from the wells, but to prevent failure from such a contingency, all the arrangements will be ready to commence hauling from the California mills as soon as any perceptible diminution becomes apparent at the wells. Tuesday or Wednesday next the furnace will be fired up.

EXPERIMENTING.—The Gamble Bros., of Salt Lake, who arrived here a few weeks ago, are conducting an experimental leaching process on Treasure hill, with a view of utilizing the low-grade ores there. So far they seem to be satisfied and encouraged by the results attained. About two weeks more will demonstrate to their entire satisfaction whether the ores will yield a profitable return by the leaching process.

MONTE CRISTO.—We learn that the efforts which owners of valuable mining property at Monte Cristo have for some time been exerting to induce capital to take hold of these properties is likely to soon meet with success. An English company, having the development of a group of mines around Monte Cristo in view, is being organized, and its intention is to commence operations at no distant day.

Arizona.

MINING ITEMS.—*Citizen*, May 8: A rich body of ore has been struck in the Vulture mine, and the 10-stamp mill is shipping \$4,000 worth of gold every week. Ore in considerable quantity worth \$800 per ton has been cut into in the lower tunnel of the Tiptop mine. Milner and Watson are taking out very rich ore from their mine on Mineral hill. The Tiger mine, Bradshaw district, is looking remarkably well, fully 15 feet of pay ore in the north drift. C. B. Genung has arrived with the hoisting machinery, blower, etc. Rumor says that a mill will soon be on the ground. A great many people in Tiger and Pine Grove Districts are working ledges and prospecting. Lynx Creek district, one of the oldest and best in the mountains, will, it is thought, shortly put on brisk mining airs. There is talk of a mill and other improvements. The Peck, Tiptop, Poy and other producing mines are in fine condition for yielding ore. A large and constant supply of bullion is coming from these mines.

Colorado.

LEADVILLE.—*Denver Tribune*, June 11: The Long & Derry mine near this place is likely to prove a very good property. It is already thoroughly opened and is being actively worked, having yielded about \$75,000 worth of ore. Some of the ore has milled as much as 700 ounces of silver per ton.

LAKE CITY.—We have another good excitement, this time Arizona is the long looked for El Dorado. A certain party has been here for a number of days and has been telling some marvelous tales of his adventures in that Territory, and of finding \$3,000 per day diggings to the man. He has created quite an excitement among a certain class, who are preparing to leave for the field of action or hack action by the first of the month. He states that he was there 10 years ago, and the question is, why has he not said something about it before? Gold may be there, but it does not seem hardly possible that he would have remained quiet these years, and now endeavor to raise a company.

CENTRAL GULCH.—The Longfellow mine at this place is shipping about six tons per month of ore which nets \$200 to \$300 per ton. The shaft is 80 feet deep, and at the end of the cross-cut tunnel, run in a distance of 65 feet, the vein has been cut and a drift run 50 feet west thereon. Drifts are also being driven to the east and west from the shaft, and stopping will soon be commenced, when the output will be materially increased. As far as opened up the showing of the mine has been unusually fine.

Utah.

BINOHAM HIGHLAND.—*Salt Lake Tribune*, June 9: Though the lead market still presents an unfavorable aspect, it does not appear to have a depressing influence upon the shipments of ore, judging from the quantity that daily leaves this section. The owners of the principal mines evince an unwillingness to operate by hiring and find it more advantageous, pecuniarily, to sub-let. The majority of the mines now being worked are on lease, and considerable ore is being extracted. There are about 40 different claims being actively worked in this section, the most of them on lease, from four or five to 20 or 30 men being employed on each claim. Gold, silver and lead are all produced here, some of the ore being very rich in each of the metals. The most of the miners who worked under leases are doing well. Some making large wages.

FRISCO DISTRICT.—Ground has been broken for the new hoisting works of the Great Horn silver mine. A new working shaft is already started and has attained a depth of 20 feet. It will be sunk to the ore body as fast as circumstances will permit. The ore body in the mine is immensely rich. Both smelters are running and making two car lots of bullion per day. The company will bore an artesian well here, for water is getting scarce. The Frisco reduction works are pushing ahead their new improvements as fast as possible, and will soon be

ready to run out lots of silver bricks. Wm. Raht is superintending the construction of the roasting chloridizing ovens. One of them is now finished. Mr. S. Carlisle is completing this great roasting furnace for Messrs. Godbe & Co. He has also been doing the fire rock work for the Bonanza company. We have the best fire rock in the United States. The lining in Godbe stack has stood the blast for over 60 days. The smelter at Shautie is running and cleaning up little job lots of ore, but the bulk of the ore in Star district is being shipped to Frisco to be reduced.

News in Brief.

A LARGE number of hogs are dying near Reno from some unknown cause.

EMIGRATION on a large scale has lately commenced from Lorraine to France.

THE Wood tariff bill has met with final defeat in the House of Representatives.

GRAIN is worth six cents per pound in Prescott, Arizona, just now, and scarce at that.

THE opinion prevails in Manchester, England, that this cotton strike will be ended this week.

THE coinage of the Carson Mint for the last month was \$701,000 in standard silver dollars.

JOHN KYLE was thrown from a horse at Petaluma, Cal., last week, and received fatal injuries.

ON June 6th four unknown men in a boat went over the Cascades in Oregon and were drowned.

SOME fields near Healdsburg, Cal., that were thought to be of cheat, are now developing into wheat.

SNOW to the depth of five feet fell a few days since at San Geronio pass, San Bernardino county, Cal.

ARTIFICIAL ice sells in New Orleans for \$10 per ton, and Northern ice has been driven out of the market.

A SON of Brigham Young has gone to West Point, to be educated at the Government's expense, making the third thus honored in the past six years.

LOS ANGELES county, California, figures on 1,500,000 pounds of wool this season, half of last year's clip.

L. J. ROSE, of San Gabriel valley, Los Angeles county, has paid a tax of \$30,000 on brandy during the past year.

NEARLY 300,000 bushels of grain will be cut in Honey Lake valley this year, the most of it raised on sage land.

SIX members of a family named Rogers, living in Austin, Nev., were poisoned last Monday by eating canned salmon.

B. R. PRINCE, of Altaville, Calaveras county, has a coccoony in successful operation, with about 500,000 silkworms.

AMERICA has sent over 400 missionaries to Turkey and spent \$5,000,000 in efforts to convert the Turks to Christianity.

It is asserted that Germany has invited the Powers to consider necessary measures for checking conspirators located abroad.

THE trial of the Chinaman Wong Chu Shut, just convicted of killing a countryman, cost the county of Los Angeles \$2,500.

AT Bayou Sara (La.) on the 7th inst. six negroes were seized by the mob and hung for attempting to kill Dr. Wm. Archer.

A DECREE has been issued at Berlin proclaiming the Regency and nominating Crown Prince Frederick William as Regent of Germany.

It is reported that a company will soon commence building a narrow-gauge railroad from the town of Sonoma to deep water on the creek.

ON the 7th inst. an explosion took place at Evans' wood-pit colliery, at Haydock, six miles south of Wigam, in Lancashire, Eng., killing 280 men.

HON. JOHN SCOTT HARRISON, of North Bend, Ohio, son of President Harrison and father of General Benjamin Harrison, recently died, aged 73 years.

It stormed every day last week at Susanville, Lassen county. Three times during the week the mountains surrounding the town were covered with snow.

JOHN C. FREMONT, Jr., son of Gen. Fremont and an Ensign in the Navy, clandestinely married a Miss Anderson, in Washington, before his departure for Europe.

REV. KNOWLES SHAW, the evangelist, was recently killed by the ditching of a train in Texas. Five other persons were seriously, and 12 painfully, wounded.

A DISPATCH from London says: Lancashire cotton mill owners are arranging to bring operatives from the United States, in view of the continued lock-out.

THE wine-making industry in California has thus progressed: In 1859, 500,000 gallons were made; in 1869, 1,000,000; in 1872, 3,000,000; in 1875, 7,000,000; in 1876, 10,000,000; in 1877, 8,000,000.

TOM MAGUIRE, theatrical manager, has engaged Henry Ward Beecher to deliver ten lectures on the Pacific coast in the fall, Beecher to receive \$10,000 for the course and an additional \$1,000 for expenses.

DR. DIO LEWIS and 12 of his party are camping at the foot of the hills near Calistoga. They will probably remain in the valley two weeks or more, and then move toward Lake county, where they intend to remain during the warmest weather of the summer.

THE laborers on trike in Quebec parade the streets and refuse to allow men to work on the street railway or on the public works under \$1 per day. Some of the contractors have given way to the demands of the men.

THERE is no immediate prospect of a cessation of the distress in China. Large quantities of grain are being conveyed into the famins districts.

MILLIONS of grasshoppers are threatening destruction to the crops in Sierra valley. Before hatching their eggs were an inch thick, and though the late storm killed millions of them tens of millions remain.

ELECTION returns from Oregon indicate that the Democrats will have a majority in this Legislature, thus insuring the election of a Democratic United States Senator. The Republicans elect the Governor and a majority of the State officers.

EVIDENCES of a Socialistic plot to murder the Imperial family of Germany, as well as Prince Bismarck, continues to accumulate. The most intense excitement exists throughout Germany, and the police have made many arrests of suspicious persons.

THE stallion "Specter," owned by Colonel Dorsey of Stanislaus, California, was killed a few days ago. He got loose from his stall and went among a herd of horses, when one of them kicked him over the eye, breaking his skull and killing him instantly.

THE Chicago Board of Trade has passed a resolution memorializing Congress to provide for the increase of this army to 100 regiments of 1,000 men each, "to the end that all parts of our country may be protected against the emergency likely to arise of complications from without or of demonstrations of violence within our own country."

EMPEROR WILLIAM continues to improve. His would-be assassin, Dr. Nobeling, still remains in an unconscious condition. A brother of Nobeling, an officer in the army, has been arrested. Bismarck is very nervous over the situation. The German Government has been anonymously informed that if Dr. Nobeling is harshly dealt with every sovereign in Europe will be assassinated.

PORTER ROCKWELL, under indictment for the murder of Aiken and others, parties from California in the year 1857, died suddenly last week at Salt Lake City. He was about 60 years of age, and was to have been tried next September. It is believed that he was poisoned at the instigation of prominent Mormons who were fearful that he would through his confessions implicate them in the commission of numerous crimes.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

CON. DORADO M. Co.—June 5th. Capital stock, \$10,000,000. Directors—John McDougall, Chas. A. Harris, C. H. Sillman, John Willenshurst and Philip Corcoran.

NEW HOPE M. M. & D. Co.—June 6th. Capital stock, \$400,000. Directors—Wm. M. Stewart, James Morgan, J. R. Hardenbergh, S. B. Hardenbergh and O. F. Wiley.

ST. LOUIS G. & S. M. Co.—June 6th. Capital stock, \$10,000,000. Directors—C. Benedict, John D. Graham, John Haynes, W. G. Graham and E. S. Irwin.

BUSHNELL G. & S. M. Co.—June 6th. Capital stock, \$10,000,000. Directors—C. Benedict, John D. Graham, John Haynes, W. C. Graham and E. S. Irwin.

MUSICAL BOXES.—The roar of the great May musical festival will not drown the sweet melody which is poured forth by the musical caskets of M. Paillard & Co., 120 Sutter street. These little gems of harmony, made by a branch of the firm in Switzerland, and sold in San Francisco by the makers, are unequalled in their construction and performances. They are elegant articles for presents to friends, and they are charms to possess for oneself. They amuse by their wonderful power, and they soothe and instruct by the faultless execution of the finest musical airs. The excellence of the instruments is sufficiently attested by the high awards which have been made to them by world's fairs and local exhibitions, and they commend themselves to all who come within the sound of their trills and cadences. M. Paillard's establishment at 120 Sutter street, should be visited by all who come to see the sights of the city.

BULLION SHIPMENTS.—Since our last issue shipments of bullion from the prominent mines have been as follows: Modoc, June 8th, \$8,876.65; Tyho Con., June 7th, \$4,141.34; Northern Belle, June 8th, \$4,516.40; Standard, June 9th, \$33,397.10; Christy, June 10th, \$4,899; Tyho Con., June 5th, \$8,112.93; Hackberry, June 10th, \$12,000; Independence, June 10th, \$18,000; Northern Belle, June 5th, \$4,661.21; Modoc, June 2d, \$10,189.51; Justice, June 7th, \$11,700; Raymond & Ely, June 13th, \$4,787.97; Modoc, June 3d, \$3,845.39; Northern Belle, June 3d, \$4,858.08; Tyho Con., June 1st, \$3,994.42; Manhattan, June 12th, \$14,500.

LAND, SCRIP AND WARRANTS.—An advertisement in another column describes the business of D. H. Talbot, land, scrip and warrant broker, at Sioux City, Iowa. The attention of those needing the services of a broker in these properties or claims may find his announcement of advantage to them.

JOHN C. FREMONT has been appointed Governor of Arizona by the President.

The Bread-Fruit.

The bread-fruit tree, an important tree of the order *Artocarpaceae*, is a native of Southern Asia, of the South Pacific and of the Indian archipelago, and is now naturalized in some of the West Indies with some success. In the South Pacific it grows in the Sandwich islands, the Marquesas, the Society, the Samoas, the Fijis, the New Hebrides, and, in fact, in most of the larger tropical islands, where it delights in rich, moist, sheltered situations. It attains a height of from 50 to 60 feet, and measures about six feet in circumference at the base. The leaves are glossy, dark-green, which are pinatifid, or deeply divided into gracefully pointed lobes or scollops, like those of a lady's lace collar, and from 6 to 12 inches in width, and from 12 to 18 inches in length. As they are deciduous, and as they fade they almost rival the prismatic colors of the rainbow.

The greenish and inconspicuous, unisexual flowers are borne crowded on aments or catkins, the staminate ones being club-shaped, while the pistillate ones resemble the balls of the sycamore; both on the same branch.

The fruit, which is a *sorosis*, is nearly spherical, and somewhat resembles in magnitude and general appearance one of our citron melons of ordinary size, and sometimes weighs four pounds or more, but, unlike the melon, is not ribbed longitudinally; its surface is marked with a network of small hexagonal divisions, having each a small prominence in the middle. It greatly resembles, on a larger scale, the fruit of the osage orange, to which tree, as well as the mulberry, it is closely related, botanically.

The refreshing green of its rich foliage, the large and singular-looking fruits that hang from its branches, together with the pleasant shade

the remaining part placed in a sort of shallow wooden dish and briskly worked with a stone pestle or pounder; with the addition of a large quantity of rich cocoanut milk, this is the great staple of food; it somewhat resembles in its consistency our book-binders' paste, and is known as "poi poi," although "poi poi" is often made of taro and other esculent roots. The native way of eating this is by thrusting the two forefingers of the right hand into the mass, which is generally kept in a large wooden bowl, and, securing as much as will adhere to the fingers, passing it into the mouth with rapid evolutions. Besides these there are a great many other ways of preparing this valuable food.

Formerly one method of preparing the bread-fruit was as follows: The population of a district would assemble and form a large common oven, by digging a pit from 10 to 15 feet in diameter and from 8 to 12 feet deep, and filling it with firewood till the heat becomes very great. The covering is then removed, and many hundreds of ripe bread-fruit thrown in with leaves laid over them, and the remaining hot stones were placed above them, and the whole covered with leaves and earth. Thus they were left for a certain length of time before being opened. This wholesale mode of baking the fruit has, however, been much discontinued since the introduc-

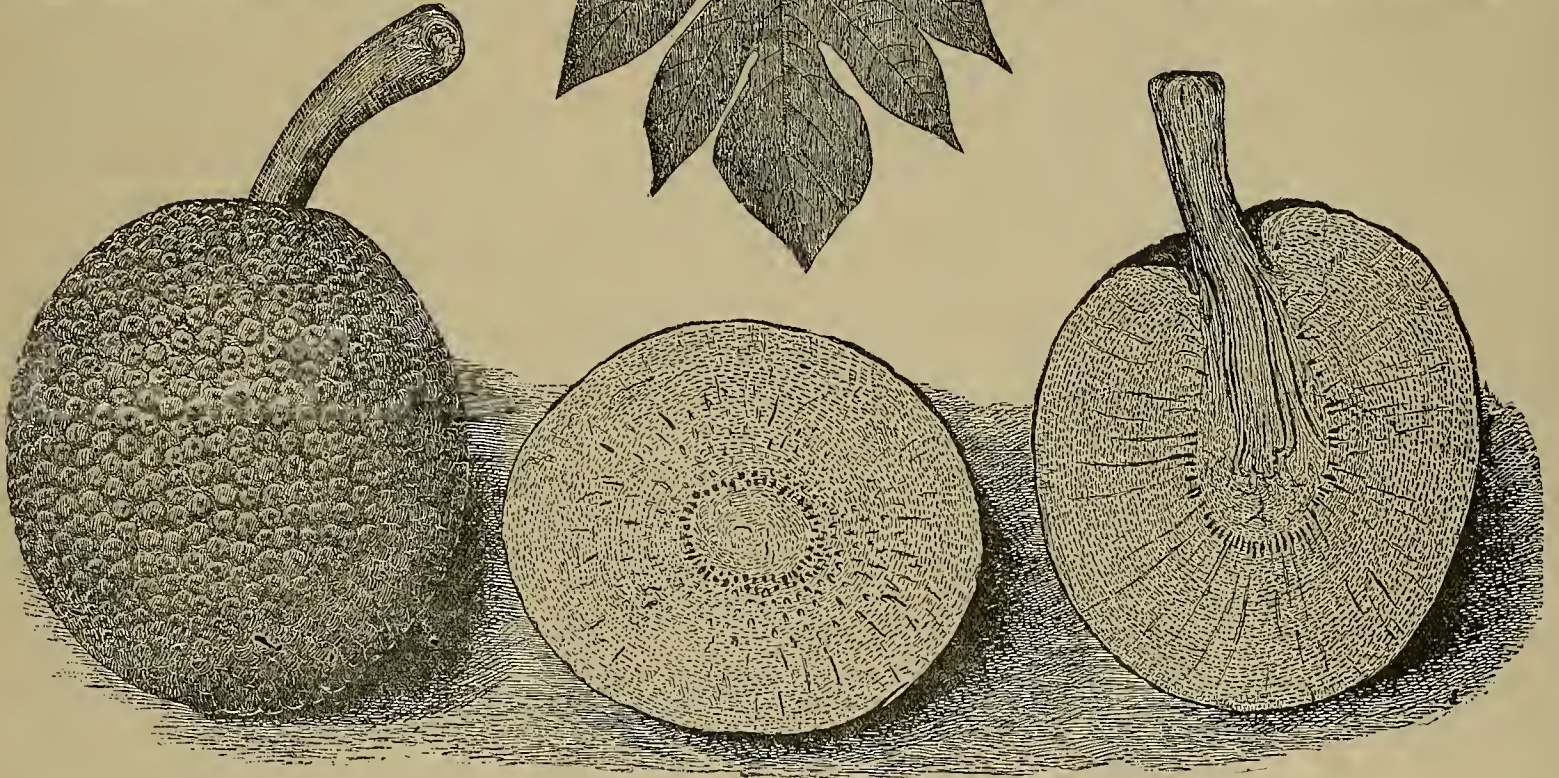
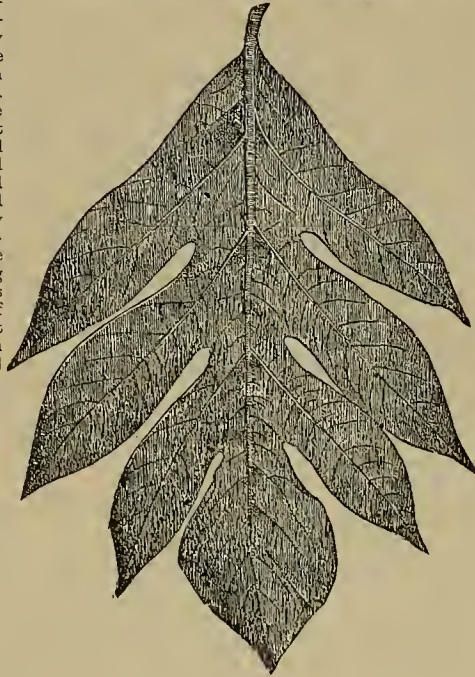
Product of the Eureka District.

During the month of May, crude bullion was shipped from Eureka district valued at \$726,500. In the same period the Richmond company forwarded fine dore bars aggregating \$211,300. This was the product of the refinery. The output of the furnaces exceeded that sum by \$80,000. The value of the lead sent forward is estimated at \$210,000, and the ore and flue dust shipments will add \$20,000 more, making a grand total of nearly \$1,247,500. This is an increase over the month of April of nearly \$100,000, and at the present writing is safe to predict that we will swell these figures still more this month. We base our calculations on the fact that the Eureka Con. has built one more furnace, which will add one-fifth to the bullion-producing capacity of its reduction works. The Hamburg will start a furnace about the

15th, at which time the K K will resume smelting their own ores. This, we take it, is a very handsomeshowing, and one that we may be justly proud of. The mineral belt comprised within the boundaries of the district is the richest on the face of the earth, and in the profusion of its wealth is without a rival. The lode, prospected to a depth of 1,000 feet, develops as large deposits as were

THE ENGINEER.

RAPID TRANSIT ON THE ERIE CANAL.—*Scribner's Monthly* on efforts to secure faster and cheaper passage of boats: As to the future usefulness of the canal, the first question to be asked is in relation to the moving power used for transportation. Whether the late improvements in the power used will enable the canal to compare favorably with the rail as to the actual cost of moving freight. Many plans for quick and economical transit have been submitted to those persons designated by the State to examine them, embracing the use of steam, water-power, towing by endless cables, etc. The plan of coupling two boats together, with the steam power applied only to one boat, which pushes the other ahead, shows a great saving of labor and fuel. The coupling is so ingeniously arranged that it is a very simple matter to uncouple the boats in order to allow them to pass through the locks separately. The expense of moving them, as seen by a statement submitted, is \$602.58 for making the entire trip from New York to Buffalo and return, with an average load of 315 tons; and in this expense are included tolls, fuel, oil, depreciation of and interest on property, labor, insurance and sundry expenses, etc. The time consumed is 19 days. This comprises a distance of about 1,000 miles, over which 315 tons of freight have been moved at an expense of \$602.58, which is a little less than two mills per ton per mile. A comparison of the old method of towing by horses shows a saving of time of at least five days, while the capacity is twice as great, and the actual cost is only one-quarter as much. It has been mentioned by excellent authority, that for 47 years the actual cost of transportation of freight by canal where horse-power has been used, aver-



FRUIT AND LEAF OF THE BREAD FRUIT—REDUCED FROM NATURAL SIZE.

it affords, all combine to render the bread-fruit one of the most attractive trees to those who visit Polynesia.

The bread-fruit contains a large portion of starch or fecular, and forms one of the principal articles of diet amongst the islanders of tropical Polynesia. The natives are remarkably fond of it and it appears to be very wholesome and nourishing. There are numerous varieties of this noble tree, all of which have distinct native names.

The pulp is juicy and light-yellow, when it is fully ripe, but it is in a better condition for eating before it arrives at that stage of maturity. The rind is perhaps an eighth of an inch in thickness; and denuded of this, at the time when it is in the greatest perfection, the fruit presents a beautiful globe of lightish-yellow pulp, the whole of which may be eaten, with the exception of a small core, which is easily removed. However, it is never used, and indeed, altogether unfit to be eaten until cooked in some way. The most simple mode consists of placing any number of the freshly-plucked fruit, when in a particular state of greenness, among the embers of a fire, in the same way that you roast a potato, and sometimes among heated stones. After the lapse of 10 or 20 minutes the green rind embrowns and cracks, and when it is removed it has the appearance of "a beautiful light-colored smoking loaf." Thus eaten it has a mild and pleasant flavor. There is one other form, however, in which the fruit is generally served that renders it a very pleasant dish. As soon as it is taken from the fire, the exterior is removed, the core extracted and

tion of Christianity into the islands, in consequence of the feasting, debauchery, rioting and kava drinking that invariably follows the opening of one of these ovens.

This invaluable tree, besides producing two or three regular crops annually, yields a fine resin, which the natives use to render the seams of their canoes and boats water-tight. The leaves they sometimes use for thatching their houses and other purposes, and the inner bark of the young branches for making a common variety of tappa or native cloth. The timber, which is light, and of a rich yellow color, is used for posts of houses, making canoes, and many other useful purposes.

We are indebted to Mr. C. D. Voy, of Oakland, who has studied the fruit in its habitats, for the materials from which to make our illustrations and descriptions.

COAL FIELDS IN PERU.—A coal bed of unknown extent has been discovered at Chala Alta, near Oluzco, in the Department of Libertad, Peru. The government sent a scientific commission to examine the deposit, and has received a highly favorable report. The Chala coal field will, it is estimated, suffice to supply the requirements of the whole of South America, and the quality and cheapness of the coal will enable it to drive the English coal from these markets. The average consumption of coal on the coast of Peru is estimated 200,000 tons per annum, which at the rate of 22 sales per ton gives a total of 4,400,000 sales, at present paid to England for fuel, and which Peru hopes to save by utilizing her newly-discovered fields.

found on the surface, and the lowest point now reached is in an ore body that promises from present indications to exceed in dimensions and value anything ever found on the vein. The Richmond and Eureka Con. ore bodies, as prospecting continues, show no signs of diminution, and the reserves are larger than they were at the beginning of the year. The K K Con is about to develop the deposit found between the sixth and seventh levels, a bonanza of high grade and large proportions. The Jackson has struck rich ore on the third level, and the mine never looked better. The same may be said of the Connolly. The Hamburg has 6,000 tons of ore in sight, with a prospect of increasing that amount indefinitely. The other properties, both on and outside of the lode, are looking and yielding well, and, taking it all in all, the outlook was never brighter than at the present time.—*Eureka Sentinel*.

The *Utica Republican* talks thus about postal absurdities: There are some very queer things about our postoffice regulations. Take the postal card, for instance. If a man has a steady hand and writes close, he may put several hundred words on a card and send it for a cent. If he pastes the least strip of printed matter on it the postage is increased to six cents, though he may print on it the same matter, and by putting it in small type get several thousand words on the card, and it will go for one cent; and he may paste the card all over with printed matter, then put it in an open envelope, and it will go for one cent.

aged a trifle over eight mills per ton per mile. It is hardly probable that the rail can bring it down to six.

AN INDIAN BRIDGE.—At a recent meeting of the English Institution of Civil Engineers, a description was given of the Alexandra bridge on the Punjab Northern railway in East India. The Alexandra bridge was 9,300 feet long and 100 feet deep. The first brick was laid on the 1st of November, 1871. The first train crossed the bridge on the 23d of December, 1875; and it was opened on the 27th of January, 1876. The first design for the bridge was that it should consist of single well piers, 12½ feet in external diameter, sunk 40 feet, and carrying lattice girders under the rails, 97½ feet in length from center to center of the piers. But the high floods of the rainy season of 1871 led to the adoption of Power's three-well system, and to the wells being sunk 70 feet. The piers were 35 feet long, 8 feet 8 inches thick, with semicircular ends, standing on similar basements 38 feet long, supported on diminishing arches between the wells. Three were to be sunk 6 inches apart. The abutments were on 15 wells, sunk to the same depth as the piers, and in two rows parallel to the central line. This change increased the quantity of brickwork originally proposed 5 or 6 times. At the close of the rainy season of 1871 the curbs of several of the piers were pitched. It was then determined to adopt Warren girders, and to have the rail level at the bottom; also to have 64 spans, 142 feet from center to center, and the bridge was thus commenced. The bridge

over the Pulkoo back channel consisted of 9 spans, 43½ feet from center to center, with piers of single well cylinders sunk into the clay substratum underlying the river bed. The girders were of plate iron, carrying the rails on the top.

COLORADO PROJECTS.—The special correspondent of the *Chicago Tribune* writes from Denver, Col., as follows: From present appearances, there will be more miles of railroad built in Colorado, this year, than in any other State west of the Missouri. The Denver and Rio Grande narrow-gauge road has been stretching out by sections, until it now has in operation 296 miles of track, and the extension to Alamosa, on the Rio Grande, now under way, will add 32 miles more. The latter point will be reached within 60 days, and by that time the company will reveal their plans, and the construction force either be put to work on the extension to Chihuahua, in New Mexico, or direct to Del Norte and the San Juan mines. In either event, from 100 to 150 miles of new road will be put in operation during the present year. It is hardly possible that the late active and almost bloody contest for the possession of the Grand canyon of the Arkansas, between the Denver and Rio Grande company and the Atchison, Topeka and Santa Fe, for the present "off," by both parties withdrawing, under an injunction from the courts, may, if decided in favor of the former company, lead to the immediate extension of their Arkansas river branch from Canyon City to Leadville, the new silver lead, El Dorado, over which there is so much excitement. Should the Atchison, Topeka and Santa Fe company win the right of way through the canyon, it is their intention to build a broad-gauge road from Pueblo alongside the Denver and Rio Grande track to Canyon City, and thence to Leadville and Ouray, in the San Juan country, surveys for which have already been made.

THE NEW CLYDE DOCKS.—The new docks constructed on the Clyde show the extensive scale on which this kind of engineering is now carried on, and the adaptation of modern scientific principles and methods to the most complete achievements in the line. The cost of one of these docks is stated to be \$8,000,000, and when entirely finished, the water surface will extend to 34 acres, the length being some 3,000 feet, and the breadth 700 feet, with a water depth of 20 feet. Access to the basin, which is a tidal one, is obtained at the southwest extremity, the passage being 180 feet in width. On the north side, the wall of the quay is founded to the depth of 41 feet below the level of the quays; a central quay passes from the eastern end, parallel with the north and south side walls, separated from them by waterways for a distance of 270 feet, with a uniform breadth of nearly 200. The water space between the western end of this quay and the west wall of the dock forms a sailing ground, and is of such dimensions as to permit of the largest vessels being moved and turned about with every freedom. A strong iron bridge on the swing principle is placed at the entrance to the dock, and, although it weighs 800 tons, is 181 feet long and 40 feet broad, can be moved from one side to the other in a minute and a half. The bridge is worked by hydraulic power supplied from an engine house in the vicinity.

RAILROADS IN WASHINGTON TERRITORY.—The *Seattle (Wash. Ter.) Pacific Tribune* gives the following statement of railroad mileage in the Territory: Washington Territory contains six pieces of railroad, the aggregate length of which is 194 miles. The oldest and shortest of these pieces is six miles in length, around the lower Cascades of the Columbia, and was built and is owned by the Oregon Steam Navigation Company. The next piece is that section of the Northern Pacific between Kalama and Tacoma, 105 miles, which, with a 31-mile section from Tacoma to Wilkeson, built last year, and the lower Cascades road, comprises all that we now possess of standard gauge. The Walla Walla & Columbia River railroad, connecting the town of Walla Walla and Wallula, is of narrow-gauge and 31 miles in length, and the Seattle & Walla Walla railroad, running from Seattle to Talbot, Renton and Newcastle, is also of narrow-gauge, and is 21 miles in length. The only road now building in the Territory is the Thurston County, from Olympia to Tenino, a narrow-gauge and 15 miles in length. The Union and Northern Pacific companies, and the Walla Walla and Seattle companies are looking forward to great extensions during the year ensuing, and it is but a reasonable prediction to make that our railroad system will surely be doubled before January 1st, 1880.

GREAT PYRAMID OF EGYPT.—An English architect, Mr. Tite, has been "figuring up" the cost of the great pyramid near Gizet. Its original dimensions at the base were 764 square feet, and it has a perpendicular height of 450 feet, covering four acres, one road, 22 perches of ground. It consumed 89,025,000 cubic feet of stone; and Mr. Tite adds that it could not now be built for less than £30,000,000 sterling. The joints of the large casing blocks of granite were so fine as to be scarcely perceptible, not thicker than paper; and the mortar was so adhesive that the stones in some cases broke through their substance rather than give way at their jointing. The cost, therefore, of this structure, reduced to Federal currency, was \$145,200,000, a sum large enough to build and put in running order six good, substantial railroads between New York on the Atlantic and San Francisco on the Pacific.

USEFUL INFORMATION.

Petroleum Oils as Lubricators.

Those who are developing our petroleum resources in the southern counties will be interested to learn the estimation in which these oils are held. Oils from petroleum, says *Seward's Coal Trade Journal*, are now produced suitable for nearly every mechanical process for which animal oils have heretofore been used, not excepting those intended for cylinder purposes. A serious objection attaching to the animal oils is present in petroleum. If, through the exhaust steam, some of the oil be carried into the boiler, foaming or priming is the consequence, but the same thing happening in the case of petroleum is rather a benefit than otherwise, for it not only does not cause foaming, but it prevents incrustation or adhesion of the scale or deposit, and this aids in the preservation of the boiler, and is perhaps the best preventive of the many everywhere suggested.

Often, in removing the cylinder-head and plate covering the valves of an engine, we see evidences of corrosion or action on the surfaces, differing entirely from ordinary wear, and the engineer is generally at a loss how to account for it. According to the general impression, grease or animal oil is the preservative of the metal, and is the last thing suspected of being the cause of its general disintegration. The reason of this is that vegetable and animal oils consists of fatty acids, such as stearic, margaric, oleic, etc. They are combined with glycerine as a base, and, under ordinary conditions, are neutral to metals generally, and on being applied they keep them from rusting by shielding them from the action of air and moisture. But in the course of time the influence of the air causes decomposition and oxidation, the oils become rancid as it is called, which is acid, and they act on the metals. What happens at the ordinary temperature slowly, goes on rapidly in the steam cylinder, where a new condition is reached. The oils are subjected to the heat of high-pressure steam, which dissociates or frees these acids from their base, and, in this condition, they attack the metal and hence destroy it.

This applies as well to vegetable as to oils of animal origin, fish or sperm oil included. Petroleum and oils derived therefrom (generally called mineral oils), are entirely free from this objection. Petroleum contains no oxygen, and hence it cannot form an acid, and therefore cannot attack metal. It is entirely neutral, and so bland that it may be and is used medicinally as a dressing to wounds and badly abraded surfaces where cerates of ordinary dressing would give pain.

FIRE GILDING.—A method of reproducing the famous, because rare, fire-gilded glass of the Egyptians has been recently patented, and from the results attained it would appear that the inventor, if he has not discovered the ancient process, has devised an excellent substitute. Fire-gilded glass, says the *Echo*, is a glass into which gold is so worked that many hundreds of years have failed to effect any change or to tarnish the gold. The trustees of the British Museum were so pleased with the result of the modern process that they accepted from the inventor, Mr. D. Hussey, specimens of his recovery of a lost art. The process consisted in introducing gold leaf or platinum into the body of the glass, and amalgamating the precious metal with the glass by means of a blowpipe, an operation which also serves to produce a perfectly indestructible covering to the metal and the designs traced. The product so much resembles the ancient work that the method is likely to find a tolerably wide field of usefulness—or at least of profit to its inventor.

A GOOD CLEANSING FLUID.—The following is commended for washing alpaca camel's hair, and other woolen goods, and for removing marks made on furniture, carpets, rugs, etc.: Four ounces ammonia, four ounces white Castile soap, two ounces alcohol, two ounces glycerine, two ounces ether. Cut the soap fine, dissolve in one quart water over the fire, add four quarts water. When nearly cold add the other ingredients. This will make nearly eight quarts and will cost about 75 cents. It must be put in a bottle and stoppered tight. It will keep good any length of time. To wash dress goods, take a pail of lukewarm water, and put in a teacupful of the fluid, shake around well in this, and then rinse in plenty of clean water, and iron on wrong side while damp. For washing grease from coat-collars, etc., take a little of the fluid in a cup of water, apply with a clean rag, and wipe well with a second rag. It will make every woolen fabric look bright and fresh.

GREEN VARNISH FOR METAL ARTICLES.—A green varnish for metal articles may be thus prepared: Put as much red arsenic or mastic into a strong potash lye as will be dissolved by it, then dilute the solution with water, and add a salt of copper (vitriol or acetate of copper). The green precipitate should be washed, dried, and dissolved in oil of turpentine. Unfortunately, mastic is too dear for the varnish to be used for all purposes.

INCOMBUSTIBLE LAMP SHADES.—Lamp shades can be made incombustible by coating writing paper with two layers of water-glass of 16° to 20°. The paper becomes transparent, and is in many respects preferable to wax paper.

TREATMENT FOR HARD WOOD FLOORS.—It is true, says the *Journal of Chemistry*, that the oak floors of the old-fashioned kitchens, which lasted and looked well for a hundred years or more, were scoured with soap and sand; but the labor was very great, and could hardly be had from the modern servant at any reasonable expense. A little more care in filling and finishing, suits the present condition of things better. Any soiling from mud can be removed with a damp woollen cloth, and dust with a dry one. Sweeping with a brush, followed by wiping over with a dry woollen cloth tied over the brush, answers ordinary needs. About once in six months it is well to give the work a very thin coat of shellac. No oil should be used on it before or after finishing. The great mistake made in the treatment of hard woods, and especially where used in floors, is the amount of oil, wax, varnish, filling, and other gummy materials that are applied to and left on the surface. The beauty of all such finish is to have the wood show its natural color and grain. The thin coat of shellac, specified above, is meant simply to prevent any greasy dirt from striking into the wood and causing a stain that would require hard scrubbing or scraping to remove.

WINDOW-GLASS FACTORIES.—The *American Manufacturer* says that there are 106 window-glass factories in the United States, distributed in 13 States as follows: Massachusetts, 5; New York, 11; New Jersey, 34; Pennsylvania, 30; Maryland, 5; West Virginia, 2; Ohio, 6; Michigan, 1; Indiana, 3; Illinois, 5; Wisconsin, 1; Iowa, 1; Missouri, 2—total, 106. Of this total 33 factories are embraced in the Western Association. As each factory employs, on an average, from 50 to 75 persons, the 106 furnish work, when all are in operation, to about 7,000. The amount of common window-glass imported in the eight months ended February 28th was 13,777,838 pounds, which is at the rate of over 28,000,000 pounds a year, a quantity equal to the annual production of about 22 of our window houses.

IMMIGRATION.—Immigration, we learn from the *North American*, is beginning to show very favorable features again. A very large proportion of those who are sailing from Europe have taken return tickets, and a very small proportion of those now arriving have ever been in this country before. Last year 35% of the arrivals at Castle Garden had been in America before; of those now landing there, not more than 2% ever crossed the ocean until now, and the number is much greater than last year, over 3,000 having gone west from New York city last week.

GOOD HEALTH.

Drunkenness not Hereditary nor a Disease.

Recently, in Utica, New York, there was held a large temperance meeting, and members of the faculty of the New York State Lunatic Asylum, famous physicians, expressed their opinions upon drunkenness as a disease. Dr. Gray, the Superintendent of the asylum, said: "The idea of hereditary and transmission have induced men to blind themselves, and seek only gratification. It is not the father or the mother who is to blame for the son's drunkenness, but the son himself. I am glad to see so many women defending this cause. How many defend their husbands and sons on the ground that it was born in them. It cannot be born in them. A kind word from the mother to her boy may save him, where the pretense of hereditary may send him to ruin. Another point I am glad to see set forth—drunkenness is a disease. The State has erected an institution where the drunkard can reflect for a time on his habits, and perhaps reform himself, and it is hoped with the present superintendence much good will be done. When a man has a flask in his pocket he has the disease. If it is gone, there is no disease."

Dr. Ford said: Inebriety is not a disease, but a self-provoked, temporary perversion of our natural functions, induced for the purpose of sinful gratification. Brain-workers often engage to do more than their physical strength will sustain, and in order to accomplish this task in a given time, they resort to brandy to quicken their flagging energies, though at an expense of that reserve force which no man realizes. The stimulant is soon taken often, and before long he finds himself broken in health, and with a habitual drinking habit formed. First, intemperance is sometimes due to a defective organization, a defect allied to imbecility. Again, it is the logical result of a defective training. It is not an inherited condition, but is acquired, and a condition for which the individual is responsible. Second, drunkenness is not a disease, nor is it produced by any disease or physical condition. It is a moral obliquity. Alcohol is not a food, and is not a necessity to healthy men, while men that are weak by inheritance—weak physically and mentally—ought to shun alcohol as they would a deadly malady. Third, alcohol intemperates and always produces deleterious changes in the most vital organs of the body, from which spring the most mortal disease, and it increases the fatality of ordinary ailments. Fourth, it is the amount of alcohol used, and not the form under which it is used, that determines the amount of evil it will accomplish."

Removing Grindstone Dust.

The Smithsonian Institution has had a translation made of a recent French work on the preservation of health in workshops. We take therefrom a few suggestions on reducing the evils of the grindstone. One of the most dangerous occupations is that of the grinder. When proper precautions are not taken, the dust arising from the grindstones, which are used dry, enters into the respiratory passages. These dangers are reduced and almost removed by the following arrangements: The stones should be surrounded as completely as possible by a movable covering of wood or sheet-iron, which should have no opening in front but what is absolutely necessary for the work.

In order to avoid the choking-up of the ventilating-pipes, it will be necessary to provide special discharge-pipes for the water, according as the stoucs are partly below or entirely above the floor.

The passage intended for carrying the dust should be placed underneath the stone, and beyond the point where the work is applied, regarding the direction of the motion. It should have a breadth a little greater than that of the stone, and a depth of eight inches, at most, for the largest stones. A sliding door serves to close it whenever dry dust is not produced. The water-discharge pipe should also have a valve, which may be closed when water is not used, and when it is desired to carry off the dust produced when the stone is trued.

The separate air-tubes from each stone lead to a collecting-pipe 16 inches by 12 inches, to which they are united by couplings.

If there are only four or five stones in the works, a single collecting-pipe will be sufficient, and the blower should be placed at the end. But if there are eight or ten stones in one line, it will be better to place a second collector, 16 inches by 12 inches, in the middle of the length of the first, and perpendicular to its direction. The blowing apparatus should be placed in the extremity of the second pipe.

Finally, if there are two long parallel rows, with eight or ten stones in each, they should also be connected with the second collector, or with a third, 16 inches by 20 inches, communicating with the ventilator.

In all these arrangements, movable valves should be placed at the junction of each of the pipes, to prevent the circulation of air in those which are not used at any time for carrying off the dust, since it is not intended to ventilate at the same time all the stones of the same mill. The valves placed at the head of each pipe should also be closed when it is not being ventilated.

But the greatest difficulty in rendering these places healthful, as in most other cases, arises from the carelessness of the workmen, and in the negligence of the foremen, who do not insist on the strict observance of the regulations.

Maladjustment of the Eyes.

In a late address before the Albany Institute, Dr. Geo. T. Stevens, of Albany, presented facts which went to show that certain intractable nervous diseases, such as chorea, or St. Vitus dance, severe recurring headaches, and neuralgia, often hereditary, which seem to be functional and not due to any morbid change in the nerves, are very frequently accompanied by an often unsuspected maladjustment of the eyes, and that when this was properly corrected by suitable glasses, the nervous disease passed away. Thus in the case of very far-sighted young persons, the attempt to read or to sew requires a muscular adjustment of the focus of sight which is quite a strain on the most delicate organism in the body and the portion where the nerves in the optic nerve seem to be most exposed. Let a young person put on his grandfather's spectacles and try to read with them, and he is made dizzy and perhaps nausea or vertigo is produced. But this is the constant condition of some far-sighted persons, and it is not strange that their nervous system is thereby shattered. A still more common and unsuspected cause is what is called astigmatism, in which condition of the eyes they fail to form a definite image. The eyes bring, perhaps, the vertical rays to a focus sooner than the horizontal ones, so that there is not a clear, defined image. To test the eyes for astigmatism, draw on a sheet of white paper parallel black lines. Cross them at right angles by similar black lines. Put them on the wall and stand off at as great a distance as they can be seen and notice if the horizontal lines can be seen further than the parallel ones. Eyes not astigmatic would see them equally clear at any distance. Whether Dr. Stevens is right or not in supposing such disarrangements of vision to be a frequent cause of chorea and neuralgia—and he cites many cases to prove it—it is very important that they should be corrected by suitable glasses.

RUSTY NAIL WOUNDS.—The *Stockton Independent* says: Every little while we read of some one who has stuck a rusty nail in his foot or some other part of his person, and lockjaw has resulted therefrom. All such wounds can be healed without any fatal consequences following them. The remedy is simple: It is only to smoke such wound, or any wound or bruise that is inflamed with burning wool or woolen cloth. Twenty minutes in the smoke of wool will take the pain out of the worst case of inflammation arising from any wound we ever saw.



W. B. EWER, SENIOR EDITOR.

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MINING STOCK MARKET.—Sales at the San Francisco, Pacific and California Stock Boards, Notices of Assessments, Meetings and Dividends, 380.

MISCELLANEOUS.—Discovery of a Mammoth Cave in Wyoming Territory; Mementoes of Bygone Black Hills Miners; Academy of Sciences; Reptiles and Insects in Australia, 370. The Bread Fruit; Coal Fields in Peru; Product of the Eureka District, 374.

NEW ADVERTISEMENTS.

Machinery, Berry & Place, S. F.; History of Bodie and Emerald Lake Summer Resort, Mrs. R. H. Culbertson, Emigrant Gap Dividend Notice, Consolidated Virginia Mining Co.; Meeting—Union Consolidated Silver Mining Co.; Assessment—Pacific Plumbago Mining and Manufacturing Co.

The Week.

No more favorable weather for all the great interests of the coast than has been experienced during the past seven days could have been desired. The growing demand for laborers in the harvest field continues, the supply in some sections of the interior being inadequate to the demand, notwithstanding good wages are everywhere being offered. The large yield of the California gold mines has as yet suffered no abatement, water for hydraulic washing continuing in good supply. More attention is being paid to quartz mining in this State just now than has been noticeable for years before, some of the companies that have recently commenced or resumed operations in the vicinity of Grass Valley and Nevada City having already developed ore bodies that make success nearly certain. The formidable revolt of the Bannock Indians announced during the week causes some surprise. The promptitude with which troops and supplies are being forwarded to the theater of disturbance meets with general approval and promises to effect the speedy and effectual subjugation of the savages. The delegates to the approaching Constitutional Convention seem likely to be made up in part from all the leading factions in the field, with a preponderance of those representing the more conservative element. The Potter investigation which appears to so agitate political circles in the East creates here scarcely a ripple on the surface of the political sea. The disposition evinced by Congress to take early action looking to a restriction to all parties on this coast, and would doubtless have had a quieting effect here had not the influx of the obnoxious race been very large of late. The National Legislature should lose no time in perfecting the measure they have in hand, rendering it sufficiently stringent to stay the tide of barbarism that is flowing in upon us.

California as a Mining Country.

Although California has been retired to a secondary position as a hulkion-producing country, it still remains in some respects the most important mining section of the Pacific coast. In the first place, the business of mining for the precious metals takes on here a more diversified character than in any of our other States or Territories. We have both gold and silver mines in California, our argentiferous ores embracing the several varieties that necessitate the use of both smelting and milling for their reduction. Our auriferous deposits are also of that varied kind that calls for the employment of multiplied means and methods for working them. We have our gold-bearing quartz lodes, yielding ores both free and refractory. These reach from one end of the State to the other. The quartz districts extend from the Coast Range into the depths of the deserts that skirt our eastern border. While vein mining has as yet been confined mainly to the foothill region of the Sierra Nevada, the business has been successfully prosecuted in many of its outlying spurs as well as in nearly all the other mountain chains in the State. There are promising quartz mines in the basin of Death valley, and up on the high benches of the Sierra. Our ore fields are illimitable, moderately fertile and generally well conditioned for economical working.

Our hydraulic mines are without a counterpart elsewhere. As regards their extent, product and the appliances in use for exploiting and working them, they are distinctively Californian. Of our drift diggings nearly the same may be said. Our gold beaches and bluffs are peculiar to the Pacific coast; so probably are our seam mines. Not elsewhere perhaps do they dredge out or undermine as here, the beds of the rivers. We have cement as well as ore mills; have hydraulic elevators for lifting the gravel out of undrainable pits, together with many other devices, kinds of mines and methods of mining not to be met with elsewhere throughout the west lands of the continent or in any other country.

The mines of California give employment to more laborers in proportion to their yield than do any others. Their product is at the same time diffused among many owners. We have few companies with large revenues, but many proprietors enjoying small incomes from their mining interests, the most of them being working men. This insures us a more permanent mining population, creates homes and families, and promotes the social well-being of all. The \$20,000,000 of bullion taken out in California does more for the cause of civilization and true progress than the \$40,000,000 taken out in Nevada. It is this more varied aspect of the business and the greater good it effects that engages the general attention and tends to keep alive the old-time interest in California as a mining country so long after she has lost rank as a bullion producer. In our next issue it is our purpose to review in a cursory way the mining industry of this State, following up the same in later numbers with similar surveys of the situation in the other Pacific States and Territories.

The Eureka Process.

Tests are now being made in this city, under the superintendence of Mr. Blanding, of Mr. Hallock's Eureka process, to which we have previously referred to in these columns. Mr. Blanding says it works well as far as it has gone in working small lots of ore from five pounds up to 38 pounds. It is a desulphurizing and amalgamation process, the ore being first roasted and then disintegrated by immersion in a solution, the nature of which the inventor keeps secret even from those working the ores. No crushing machinery at all is used. Some of the results attained are very high on certain classes of ores; when the ore has been properly roasted it has invariably given good results. No preliminary grinding is necessary, and after being put in the solution it becomes friable and easily worked. Mr. Blanding mentions as a curious circumstance the fact of working some Tuolumne county ore with large cubes of sulphurets, the cubes being from a sixteenth to an eighth of an inch in size. After being worked the form of the cubes was preserved, although the color was changed, but the gold was apparently set free without destroying the form of the cubes. The ores treated were weighed, heated in a forge, roasted and placed in the solution; then put in a Hephurn pan and ground, the whole occupying an hour and a half.

The tests have been conducted some two weeks and numbers of people have witnessed them. Mr. Blanding is still pursuing his tests, and, although he says the smaller ones seem successful, he declines expressing a decided opinion until more continuous work on a larger scale has been done. Moreover, he does not himself know the nature of Mr. Hallock's solution, and, until he does, of course cannot explain the rationale of the process, as he is yet working somewhat in the dark.

A HIGHWAYMAN robbed a man named Horton between Grass Valley and Smartsville, and while attempting to rob a second man was overtaken and compelled to take to the bushes, leaving his horse and accouterments behind him.

Metric System Tables.

We have prepared the following tables of the metric system, which give in a very condensed form a comparison of other measures with the metric system, by means of which anyone may institute comparisons readily and quickly. The tables are in a convenient form for reference, and are worthy of preservation. They fully explain themselves:

Deci. expresses the 10th part.
 Centi. " " 100th part.
 Milli. " " 1,000th part.
 Deca. " " 10 times the value.
 Hecto. " " 100 times the value.
 Kilo. " " 1,000 times the value.
 Myria. " " 10,000 times the value.

Weights.

Milligramme Mg. equals 001
 Centigramme Cg. " 01
 Decigramme Dg. " 1
 Gramme G. " 1
 Decagramme Dg. " 10
 Hectogramme Hg. " 100
 Kilogramme (Kilo.) K. " 1,000
 Myriagramme Mgr. " 10,000
 Quintal Q. " 100,000
 Ton T. " 1,000,000

The Gramme equals 15.434 grains.
 .0321 ounces troy.
 .0352 ounces avdps.
 .0022 pound troy.
 .0022 pound avdps.

Gramme equals weight of cu. cm. of water
 Kilo. " " " cu. dm. of water
 Ton. " " " cu. m. of water

Measures of Surface.

Centar Ca. equals 1 sq. m
 Are A. " 100 sq. m
 Hektar Ha. " 10,000 sq. m

The are or unit of surface, is a square the sides of which is ten meters and surface 100 square meters in U. S. surface measure. It equals

155,005. square inches.
 1,076. square feet.
 114. square yards.
 .008 square rods.
 .024 square acre.
 .00003 square mile.

Measures of Length.

Millimeter, Mm. equals 001 m
 Centimeter, Cm. " 01 m
 Decimeter, Dm. " 1 m
 Meter, M. " 1 m
 Dekameter, Dm. " 10 m
 Hektometer, Hm. " 100 m
 Kilometer, Km. " 1,000 m
 Myriameter, Mm. " 10,000 m

The meter, or unit of length equals 39.37 inches.
 .328 feet.
 1.09 yards.
 .0006 miles.

Measures of Capacity.

The liter, or unit of capacity, is a vessel whose volume is equal to a cube whose edge is one-tenth of a meter and capacity one one-hundredth of a cubic meter.

Millimeter, Ml. equals 001 l = 1 cu. cm.
 Centiliter, Cl. " 01 l
 Deciliter, Dl. " 1 l
 Liter, L. " 1 l = 1 cu. dm.
 Dekaliter, Dl. " 10 l
 Hektoliter, Hl. " 100 l
 Kiloliter (or Ster) Kl. st. equals 1,000 l = 1 cu. m.

The liter equals 61.027 cubic inches.
 .053 " feet.
 8.453 U. S. gills.
 2.113 " pints.
 1.056 " quarts.
 .264 " gallons.
 7.043 Imperial gills.
 1.700 " pints.
 .220 " quarts.
 .110 " gallons.
 .027 " bushels.

Table of Proportions—Including Length, Surface, Capacity, and Weight.

LENGTH	SURFACE	CAPACITY	WEIGHT	PROPORTIONS
Millimeter	Centimeter	Decimeter	Meter	1,000th part
Centimeter	Decimeter	Meter	Decimeter	100th part
Decimeter	Meter	Decimeter	Meter	10th part
Meter	Decimeter	Meter	Decimeter	10 times
Decimeter	Meter	Decimeter	Meter	100 times
Meter	Decimeter	Meter	Decimeter	1,000 times
Decimeter	Meter	Decimeter	Meter	10,000 times
Meter	Decimeter	Meter	Decimeter	100,000 times
Decimeter	Meter	Decimeter	Meter	1,000,000 times

Long Measure.

	Miles.	Yards.	Feet.	Inches.
1 Millimeter				.0393
1 Centimeter				.3937
1 Decimeter				3.9370
1 Meter				3.9370
1 Decameter				3.9370
1 Hectometer				3.9370
1 Kilometer				10.79
1 Myriameter				11.9

Square Measure.

	Acre	Sq. Rds.	Sq. Yds.	Sq. Ft.	Sq. In.
1 sq. Millimeter					.0015
1 sq. Centimeter					.1550
1 sq. Decimeter					15.5005
1 sq. Meter or 1 Centiare				1	110.0591
1 Are		3	28	7	97.9105
1 Hectare		35	11	5	35.0526
1 Kilometre	247	18	8	6	121.2241

Cubic Measure.

Measure of Volumes	Cubic Yds.	Cubic Ft.	Cubic In.
1 Millimeter			.0010
1 Centiliter			.6102
1 Deciliter			6.1027
1 Liter			61.0270
1 Decaliter			610.2705
1 Hectoliter			6107.7051
1 Kiloliter or Stere			286.511
1 Myrialiter	13	8	286.511

Liquid Measure—(U. S. Gallons).

Measures of Volumes	Gallons.	Quarts.	Pints.	Gills.
1 Milliliter				.0084
1 Centiliter				.0845
1 Deciliter				.8453
1 Liter				8.4533
1 Decaliter				84.5336
1 Hectoliter				845.3362
1 Kiloliter or Stere				8453.3622
1 Myrialiter	264	3	1	3.633

MEASURES OF VOLUME	DRY MEASURE (U. S. or Winchester bushel.)				DRY MEASURE (Imperial bushel.)			
	BUSHEL	PECKS	QUARTS	PINTS	BUSHEL	PECKS	QUARTS	PINTS
1 Milliliter				.0013				.0017
1 Centiliter				.0131				.0176
1 Deciliter				.1316				.1760
1 Liter				1.3162				1.7607
1 Decaliter				13.1629				1.6077
1 Hectoliter				131.6294				1.6077
1 Kiloliter or Stere	26	3	2	2.844	27	1		.7736
1 Myrialiter	283	3	1	.6440	275	3	1	.7369

WEIGHTS	TROY WEIGHT				AVD. WEIGHT			
	POUNDS	OUNCES	PWTS	GRAINS	POUNDS	OUNCES	DIAMS.	GRAINS
1 Milligramme				.0154				.0154
1 Centigramme				.1543				.1543
1 Decigramme				1.5432				1.5432
1 Gramme				15.4323				15.4323
1 Decagramme				154.3234				154.3234
1 Hectogramme				1,543.234				1,543.234
1 Kilogramme				15,432.34				15,432.34
1 Myriagramme				154,323.4				154,323.4
1 Quintal	267	11	110	8.74	220	7	6	8.3115
1 Millier or Tonneau	2670	114	12.74	2204	9	15	1.0837	

The Kilogramme is the unit of commercial weight, and is 2 1/5 pounds avoirdupois.

WEIGHTS	APOTHECARIES WEIGHT			
	LBS.	ONS.	DRAMS	SCRUPLES
1 Milligramme				.0154
1 Centigramme				.1543
1 Decigramme				1.5432
1 Gramme				15.4323
1 Decagramme				154.3234
1 Hectogramme				1,543.234
1 Kilogramme				15,432.34
1 Myriagramme				154,323.4

MEASURES OF VOLUME	MEDICAL DIVISIONS OF THE GALLON			
	GALLS.	PINTS.	OUNCES	FLUIDRAMS
1 Milliliter				16.2316
1 Centiliter				42.3161
1 Deciliter				3.1610
1 Liter				31.6105
1 Decaliter				1.10.1058
1 Hectoliter				41.0585
1 Kiloliter				50.5589
1 Myrialiter	264	1	14	4

Telephone, Microphone, and Phonograph.

EDITORS PRESS:—Noticing in the *Alta* of June 6th, an editorial entitled "The Latest Marvelous Discovery in Science," in which Prof. Hughes' microphone was described, I desire to ask if it is not identical with Prof. Edison's instrument for increasing sound, and if so to whom belongs the honor of the invention? Further, whether the instruments known as the telephone and the phonograph are American or British inventions; and also what the earliest date at which their working was made public?—J. B.

It is claimed by Prof. Edison's friends that his and Prof. Hughes' devices are identical or exceedingly similar, but they do not claim that Hughes drew it from Edison's. The future only can settle the issue.

The instruments are American inventions. As nearly as we can recollect, the telephone by Prof. Bell was first brought out in the summer of 1876, and the phonograph and microphone by Edison during the summer of 1877.

GAS NOTES.—We learn that the Reno Gas Works are being provided with fine condensers, lime purifiers and station meters, under contract with the well-known Gas Engineer, J. R. Smedburg, who has already erected a setting of wood gas retorts and one of his exquisite Pelouze and Andoin condensers at the same station. This late move completes the change from oil to coal and will win a gas of very high purity and candle power from the pitch pine of the Sierra Nevada without any admixture of Australian shale to enrich. It is anticipated that 25,000 cubic feet of purified gas will be obtained from a cord of this wood, but we are promised the actual result for publication in an early number.

Bodie District.

From Mr. Wasson's little pamphlet on Bodie and Esmeralda districts, just published, we take an engraving, showing the new town of Bodie, and also some facts concerning the place. The author says:

The winter following the commencement of the extensive operations of the Standard company (1876-7), was comparatively mild, and business men generally began to turn their attention to Bodie district. The new mill then building soon suggested a remapping and construction of a town. The site selected is a pretty one, and stretches along the western base of the bluff from the narrowing valley north and extending along the more open country south—a grassy flat between the sloping hills. There is room in which a large city could be built with but little expense as to grading. The sketch giving a side and partially bird's-eye view of the town, bluff and leading hoisting works, was taken from a high, black cliff of rocks, one and a half miles southwest of the town, from which point High Peak (so prominent when directly under it) sinks into a small protuberance upon the main bluff. There is scarcely a shrub of timber left, if any ever existed, which gives a rather unsheltered look to the situation, but less so than is seen in many other mining towns east of the Sierras. Excellent water from springs and wells pertaining, in town, is obtained sufficient as yet for ordinary uses. One large central spring—a rallying point of early times—is chiefly absorbed by the Standard mill. In connection with this spring an historic cabin existed on the site of Gilson & Barber's store—said to have been Bodie & Taylor's, and also where the original miners' meeting was held, organizing the district. But these accounts must reconcile themselves along with a variety of others encountered during the preparation of these pages. To return to the building of the present town. A wooden structure was moved over from Aurora, in which the express and Postoffice and Smith's store was located. Towards spring and summer, building assumed a brisk phase, and toward winter of last year it began to present the aspect of a rush, and everybody was more or less inconvenienced by the scarcity of lumber, to say nothing of high prices. Timbering for the mines was in the same market and wood for fuel also, but nothing serious ensued. It is a wooden town and in itself contains about 250 structures, some very prescient onns. About the mines proper there are about 100 additional habitations and shelters of one kind and another. Last winter, moreover, was a pretty severe one, though the mail and express were delivered regularly—no day failing to get through each way. The U. S. Land Office has been moved from Independence, Inyo county, to Bodie. The following extract from Ross Browne's magazine article, Aug. '65, may be in place:

Although the altitude is greater than that of any other inhabited town within the limits of the United States, and only surpassed by that of Quito, in South America, the climate is exceedingly healthy—never too warm in summer and rarely rigorous in winter. During the past winter (1863-64) the snow did not remain on the ground more than a day or two at a time; and there was a period of two months without snow, rain or unpleasant weather of any kind. This, at an altitude of 9,000 feet, is remarkable.

Bodie now has a flourishing and well-conducted journal, the *Standard*, has also telegraphic connection with this world at large. Over 400 men are employed in and about the mines, who receive \$4 per day. There are about 2,000 people in the vicinity. The Standard company employ about 75; Bechtel, 40; Syndicate, 30; McClintock, 20; Red Cloud, 20; and the Bodie, Bulwer, Belvidere, etc., 15 to 20; the Black Hawk and others, 10, and a score of mines from 5 to 10. This, and the employment given to teamsters, woodcutters, exclusive of clerks, etc., about town, will make the estimate good.

The accompanying map shows the location of the different claims in Bodie, and is partly approximate in its location of claims, and partly

made from actual surveys. Daily changes are taking place of course, but the general character and extent of the work done is sufficiently set forth in Mr. Wasson's pamphlet to render the publication valuable for future reference. A detailed description of the different mines is given, with a condensed history of each one, its product, etc.

"HYDRAULIC MINING—PLACER AND WATER RIGHTS."—This is the title of a small pamphlet, prepared and just published by T. F. Van Wageningen, mining engineer, and M. B. Carpenter, lawyer, of Denver, Colorado, and wherein is

Mining in Eastern Nevada.

Mr J. T. McCurdy writing from Osceola, White Pine county, Nevada, informs us that considerable work is now being done in the Silver Mountain district, in that vicinity, the outlook for some of the companies opening mines there being very good. In the Clipper claim a 14-foot ledge has been cut, which carries a free milling ore that has assayed as high as \$400 per ton. The Plagerman ore yields under working process \$50 in silver per ton, and 50% lead. The Golden Gate ore has gone by

Marching Upon the Inevitable.

Never before, perhaps, has society this world over been pervaded by such a spirit of discontent as at present. Everywhere is commotion, turmoil and unrest. And wherefore? Why is it that at a time of universal peace, with neither pestilence or famine widely prevalent, when popular education and free government have been extended, wealth and the comforts of life multiplied and the severer burdens of labor have been lightened by toil-saving inventions, that suffering, destitution, insanity and crimes

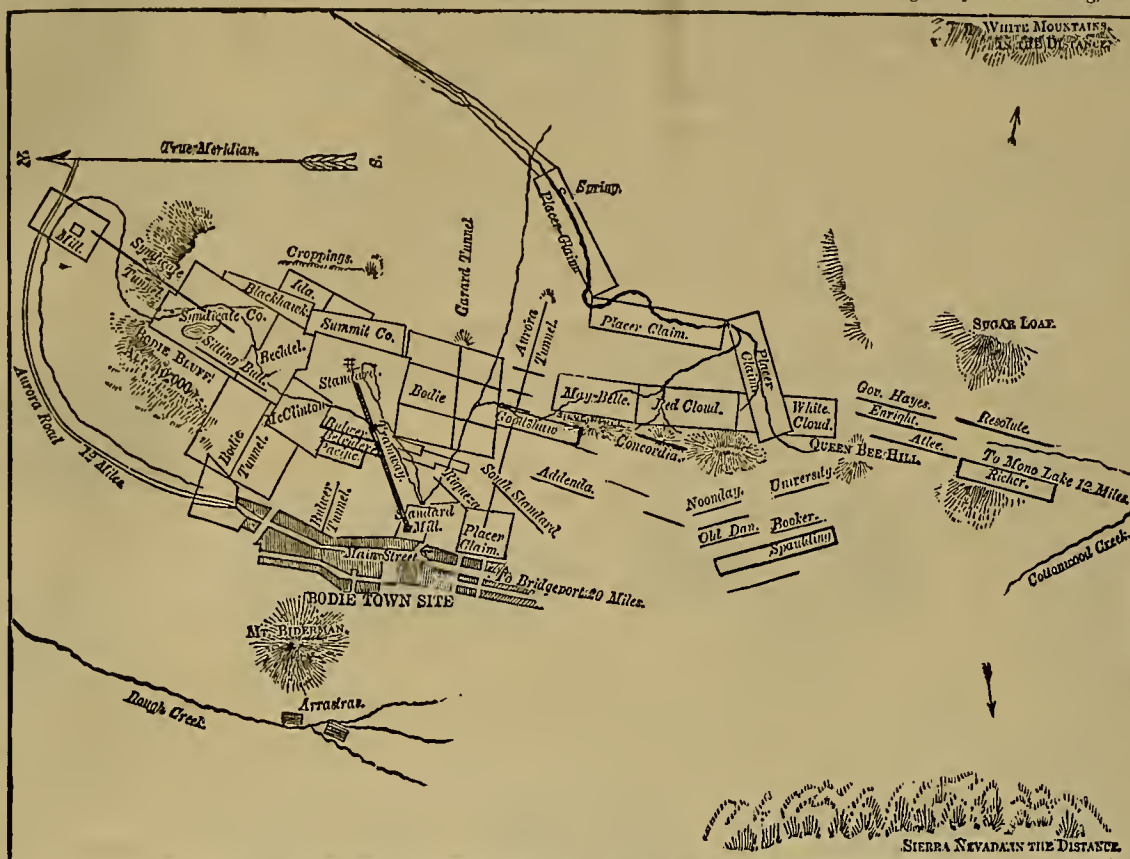
should have been steadily on the increase? Of course everybody is ready with an answer to this question. Everybody knows it is because we have been spending too much and producing too little. Mankind have fallen into idle, luxurious and spendthrift habits, which they have only to correct and all will be well. There are those, too, who argue that certain social, political or industrial reforms are necessary, they also being right. Doubtless all have a proper conception of the nature and causes of these world-wide troubles and know just the remedy that should be applied for their correction. But here is precisely where the difficulty commences. Are we capable of applying these remedies? The patient knows he is sick and what would cure him, but possibly he has not strength enough left to stand a remedy so drastic as his case requires.

Nations, like individuals, die. They die from inanity and exhaustion, brought on through the indulgence of vicious and debilitating habits, that lead at length to their extermination, or, what is worse, reduce them to a drizzling fatuity, more deplorable than annihilation itself, for national imbecility is worse than national death. Mankind have never been without their unhealthful and unnatural excipients. Later, however, these have been greatly multiplied and their use widely extended. In former times these deleterious stimulants were few and their use confined mostly to the higher classes. About the only intoxicating beverage among the ancients was wine. Now we have many others, all more hurtful, and to which means of stimulation we have superadded tobacco, opium, tea, coffee and various other substances, all more or less injurious to both the body and the mind. These pernicious excipients began to come into general use a long time ago, nearly all of them having been indulged in quite largely for several generations. At first the masses, leading otherwise simple lives, with much out-door exercise, no very marked effects followed the use of these stuffs, whether exhilarating or narcotic. But gradually their habits became less invigorating, calling for an increased use of these excipients and sedatives to soothe nervous irritations or tone up the system, the taste for the same growing all the while stronger through hereditary transmission.

And now it may be that these appetites, through the operation of prenatal causes, have become so constitutionally inherent, so incorporated with their nature before birth, that the mass of mankind can no longer resist the desire for their gratification. There is a danger that this is so. They who have studied the physiology and psychology of these questions, tell us that sooner or later this must happen and that very likely the masses have already been reduced to this helpless condition. If so, then it is to little purpose we urge the practice of greater industry and economy or otherwise call upon them to reform. To effect this requires a degree of physical strength and a will power which perhaps they do not possess, in which view of the case it becomes as useless to appeal to these hereditary thralls to emancipate themselves from their serfdom as it would be unjust to condemn them for not doing so.

The *Territorial Enterprise* says that General W. H. Williams will not, according to his own announcement, be a candidate for the United States Senate, from Nevada, as he is now a resident of California.

The Colorado river is said to be quite high, and the steamers running up from Yuma encounter a serious obstacle in navigating that stream at present from the swift current.

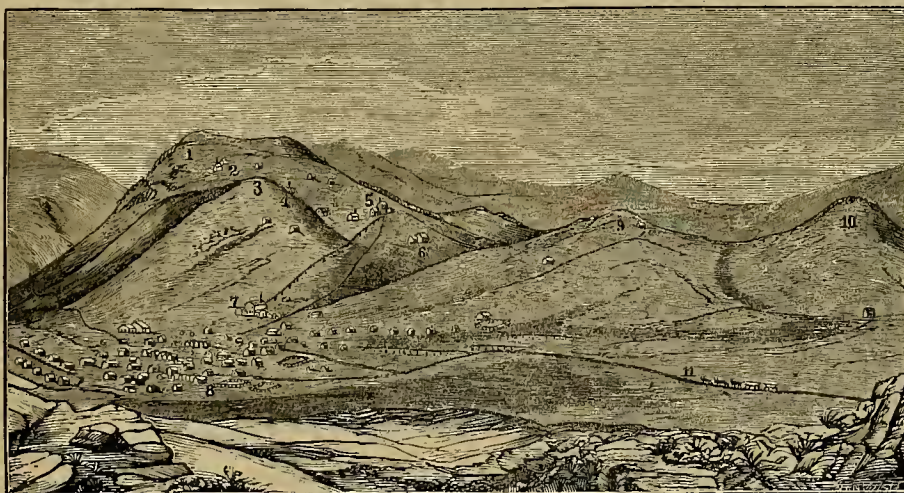


MAP SHOWING LOCATION OF MINES IN BODIE DISTRICT.

contained a variety of rules for determining the weight of water, gravel, etc.; also, rules for solving many practical problems connected with hydraulic mining, such as measurement of water, construction of reservoirs, dams, ditches, flumes and other water-ways, together with directions for building and laying down iron pipes, sluices, etc., with much other information in regard to hydraulic mining, cost and kinds of apparatus, etc. In an appendix is given a synopsis of the leading provisions of the United States laws and the laws of Colorado relating to placer mining and water rights, with forms for notices

assay as high as \$11,000 to the ton. Reed's two claims work \$70 silver per ton, and 30% lead. These mines are all being actively worked, also the Champion and Centennial. The Utica, Scorpion and Silver Brick claims have lately been incorporated in the East. They are good properties, the ore assaying from \$60 to \$140 per ton in silver and carrying about 60% lead. The present owners will soon put up smelting works for its reduction. This district is well supplied with wood and water, and the ores can be treated on the ground at a moderate cost. There is also much grass with some

out their unhealthful and unnatural excipients. Later, however, these have been greatly multiplied and their use widely extended. In former times these deleterious stimulants were few and their use confined mostly to the higher classes. About the only intoxicating beverage among the ancients was wine. Now we have many others, all more hurtful, and to which means of stimulation we have superadded tobacco, opium, tea, coffee and various other substances, all more or less injurious to both the body and the mind. These pernicious excipients began to come into general use a long time ago, nearly all of them having been indulged in quite largely for several generations. At first the masses, leading otherwise simple lives, with much out-door exercise, no very marked effects followed the use of these stuffs, whether exhilarating or narcotic. But gradually their habits became less invigorating, calling for an increased use of these excipients and sedatives to soothe nervous irritations or tone up the system, the taste for the same growing all the while stronger through hereditary transmission.



THE TOWN OF BODIE, MONO COUNTY, CAL.

and other proceedings thereunder. The book, which is of convenient size to be carried in the pocket, is sold at 75 cents per copy.

TYSON'S AMALGAMATOR.—A recent clean-up of Bryan Tyson's new washer and amalgamator at Smartville yielded 42 ounces of amalgam. It is situated at the tail end of an undercurrent 48 feet long, all the gold and quicksilver first passing over said undercurrent. It is perhaps, the only piece of machinery working in a gravel mine in the State. It is expected that some recent improvements, yet to be added, will largely increase the catch of fine and rusty gold.

WM. CULLEN BRYANT, the poet-editor, died at New York, on Wednesday morning.

good farming land in this district, which lies in the extreme eastern part of Nevada, close to the Utah line.

THE beach from Aptos to Watsonville, Santa Cruz county, has lately been taken up with mining claims. There is fine gold there, but the thing is to get it. Last winter the miners did very well; sometimes making \$10 apiece per day, but the water gave out and now they are going to try and dig a well and pump water with a steam engine. They have been at work about a month and have not yet accomplished anything.

JAMES DOWNEY, a native of New York, aged 63 years, jumped overboard from the *El Capitán*, Saturday night last and was drowned.

FOREIGN PATENTS

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PATENTS IN DISTANT LANDS.

Our Associates and Correspondents are the
Best Practitioners in every country where Pat-
ents are granted.

For Foreign Patents no model is required, as
a rule, except in Canada. The Specifications
and Drawings of the American Patent, if com-
plete and perfect, will suffice for us to prepare
the case. In Great Britain and other countries
we apply for patents in the inventors' own
names, thus avoiding their being published to
the world in the name of a foreign agent, as is
usual through other and less painstaking agen-
cies.

Frequently several inventions, covered by
different patents in the United States, on the
same subject, can be skillfully combined in one
patent in foreign countries, when well under-
stood by intelligent attorneys.

As the privileges of our inventors are cut off
in some countries, and curtailed in others, if not
applied for soon after the issue of the U. S.
patent, we advise inventors whose patents will
be valuable in various populous civilized coun-
tries, to lose no time in applying for patents
whenever they intend to obtain them for them-
selves or the benefit of others—with their own
means or through the resources of those who are
permitted to share the benefits. It must be
remembered that the English (and some other
important nations) invite the early introduction
of inventions into their realms, by offering pat-
ents to the first introducer (which means the
first applicant), without regard to the rights of
the actual inventor, who has no after recourse.

For important inventions it is best to apply
for foreign patents at the time of application for
or before the issue of the U. S. patent.

Term of Patents in Foreign Countries.

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with Instructions by the Commissioner of the Land Office;
Mining Statute of July 26th, 1890; Mining Statute of July
9th, 1870. Forms required under Mining Act of May 10th,
1872, as follows: Notice of Location; Request for Surveys;
Application for Patent; Proof of Posting Notice and Dia-
gram of the Claim; Proof that Plat and Notice remained
Posted on Claim during Time of Publication; Registers'
Certificate of Posting Notice for Sixty Days; Agreement of
Publisher; Proof of Publication; Affidavit of \$500 Im-
provements; Statement and Charge of Fees; Proof of
Ownership and Possession in Case of Loss or absence of
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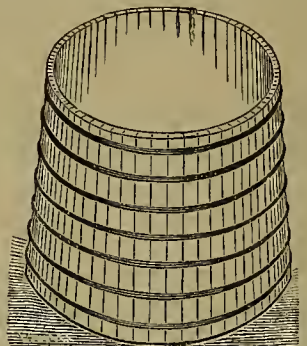
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WM. H. BIRCH. [Seal.]
JOHN ARGALL. [Seal.]

STATE OF CALIFORNIA, } ss.
CITY AND COUNTY OF SAN FRANCISCO, }

On the twenty-fourth day of May, A. D., one thousand eight hundred and seventy-eight, before me, J. Robert Read, a notary public in and for said city and county, residing therein, duly commissioned and sworn, personally appeared William H. Birch and John Argall, known to me to be the persons described in, whose names are subscribed to, and who executed the annexed instrument, and they acknowledged to me that they executed the same.

In witness whereof I have hereunto set my hand and affixed my official seal, at my office, in the city and county of San Francisco, the day and year last above written.

J. ROBERT READ, Notary Public.
[Seal.]
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PADDLE WHEELS.—Adam Wingard, S. F.
MACHINE FOR PITCHING AND CUTTING FRUIT.—Charles P. Bowen, Silver City, I. T.
SAW MILL HEAD BLOCKS.—James Brett and Bethune Perry, Albion, Cal.
POCKET FOR GARMENTS.—Yung Chow, S. F.
APPARATUS FOR REFINING SULPHUR.—Henry H. Eames, S. F.
MOP WRINGERS.—William Hagg, Walla Walla, W. T.
FRUIT PITCHING MACHINES.—Augustus T. Haleb, Cordella, Cal.
SEWING MACHINE TABLES.—Samuel Hill, S. F.
TIRE SETTERS.—John A. Miles, Rio Vista, Cal.
VENTILATORS.—Salathiel S. Thompson, Sacramento, Cal.
PIKE ESCAPES.—Ira D. Cross, S. F.
WINDOW SCREENS.—George L. Reynolds, Oakland Township, Cal.

RE-ISSUES.
ONE ROASTING FURNACES.—Charles Stetefeldt, S. F.
TRADE-MARKS.

OVERLAYS, JUMPERS AND ORNAMENTS OF OUTSIDE WEAR.—Berthold Greenbaum, S. F.
LEMONADE COMPOUND.—Abrams & Carroll, S. F.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.
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In the hands of a master clay is one of the most obedient servants. There is no form too light and spirit-like for it to assume, none too grand and majestic for it to take on, and it is so plastic under the touch that the artist in marble always realizes his ideal in clay before he immortalizes it in the snowy marble. At the same time the working of clay for the finer varieties of porcelain, and, for that matter, in the making of even the commonest of pottery and fire brick is an art of no low order. And it is probable that of all the arts and sciences more money has been spent in experimental investigation of this subject than in any other. The art is one of the oldest which man has known. Fragments of rude vessels are found among the ruins of the oldest civilizations. Frequently these fragments show a knowledge of the art which is now lost to us. There is a sort of fascination about the potter's furnace, and there is no one, perhaps, who cannot understand the weird spell that hung over Palissy when he fed into it even the food and furniture of his own household.

In Scotland, England, Germany and France are manufactured fire brick, china, porcelain and terra-cotta ware, which, with that of China and Japan supplies the markets of the world. In Europe these industries have grown to such dimensions that the labor employed is numbered by the thousands and the capital invested by the millions. We have noted of late a marked growth of some of these branches on our coast with much pleasure. We learn that the beds of clay already discovered in our State are practically inexhaustible. The clay is said to be of good quality, and when our manufacturers have learned how to deal with it, we see no reason why this industry should not be one of the most valuable in our State. We are of the opinion that the mining and agricultural resources are by no means the only ones in our State, and we wish from time to time to point out the directions in which capital and labor may find profitable remuneration.

In furtherance of this idea we lately paid a visit to the California Pottery and Terra-Cotta Works, Of Mr. James Miller, on the Alameda road, as his establishment seemed the neatest and most workmanlike that we had seen. We were agreeably surprised to find in Mr. Miller as much of the artist as his countryman, Bobbie Burns. Mr. Miller, it seems, comes from a long line of potters, and studied his trade not only in Scotland and England, but under the most favorable circumstances in nearly all the famous factories of France. A true artist withal, it seems almost a pity that such a man should be confined to the molding of chimney tops and sewer pipes, even if they be of the most artistic shape.

Mr. Miller was kind enough to show us through his works and so enable our readers to learn what is being done in this direction. Four kilns are in constant operation, either burning or being emptied and recharged. The clay used comes almost entirely from Ione, where almost inexhaustible beds have been found. The articles manufactured are at present chiefly chimney tops of the most graceful shapes, as well as tops for smoky chimneys, which are so familiar to people who have lived in the old country. He is at present manufacturing for a physician of Oakland a patent hygienic filter, a very neat and useful arrangement for filtering water through successive layers of sand and charcoal. At the same time, as the ware is porous, a gradual evaporation from the

surface of the vessel takes place, thus rendering the water cool in the hottest weather and yet not giving it that unhealthy chill which ice always imparts. They are made in two sizes, one filters 25 to 30 gallons of water in 24 hours, the other 10 to 15 gallons in the same time. We can recommend these filters to all who are affected with a horror of animalcula, as at once healthy and handsome. The Oakland office is at 465 Ninth street.

We were much amused at being shown some handsome vases of terra cotta, that they were frequently bought up just as they came from the furnace and resold as coming from Europe. This does not seem improbable, as to the eye of the initiated it would be very difficult to detect the difference.

The manufacture of sewer pipe has already become a very important branch of manufacture. It is at once a very cheap and efficient substitute for the cumbersome and uncertain wooden drains which were once in vogue. Mr. Miller assured us that he was prepared to make this pipe of the best material and would guarantee it to be proof against the action of acids. Our chemical and metallurgical men should give him a trial.

We hope to see still greater developments in this direction. There is no reason, when we learn to understand the nature of our clay beds, that the finest of china and porcelain should not be here manufactured as it is in China and Japan. It would give employment to thousands of our idle laborers and prove a permanent source of income to the State. We hope that the University of California will assist in this matter by undertaking an investigation of our clays from a chemical standpoint. We learn that there is some talk of so doing and our readers can do much to assist in this matter.

A SHORT HISTORY OF PETROLEUM.—The *Lumberman's Gazette* gives the following short history of petroleum: The production of petroleum as an article of trade dates from the 28th of August, 1859, when Col. Drake, in a well 69½ feet deep, "struck oil," and coined a phrase that will last as long as the English language. From that beginning it has increased to an annual production of 14,500,000 barrels of crude oil. The first export was made in 1861, of 27,000 barrels, valued at \$1,000,000, and the export of petroleum for the year 1877 was, in round numbers, \$62,000,000. The annual product of petroleum to-day—crude and refined—is greater in value than the entire production of iron, and is more than double that of the anthracite coal of the State of Pennsylvania, and exceeds the gold and silver product of the whole country. As an article of export it is fourth, and contests closely for the third rank. Our leading exports are relatively as follows: Cotton, annually, from \$175,000,000 to \$227,000,000; wheat flour, from \$69,000,000 to \$130,000,000; pork and its products (bacon, ham and lard), from \$57,000,000 to \$82,000,000, and petroleum, from \$48,000,000 to \$62,000,000. The total export of petroleum from 1861 and including 1877 (16 years) has been \$442,698,968, Custom House valuation. From the best sources of information there are at this time 10,000 oil wells, producing and drilling, which at an average cost of \$5,000 per well would make an investment of \$50,000,000 in this branch of the business. Tankage now existing of a capacity for 6,000,000 barrels cost \$2,000,000, and \$7,000,000 has been invested in about 2,000 miles of pipe lines connected with the wells. The entire investment for the existing oil production, including purchase money of territory, is something over \$100,000,000, which amount cannot be lessened much, if any, for as wells cease to produce new ones have been constantly drilled to take their place.

Woodward's Gardens were never more attractive than at present. Besides three lions already mentioned, six monster living alligators, several iguanas and a boa-constrictor have just been added. New stars are constantly engaged for the Pavilion exercises. Rates of admission as usual.

EXAMINE the accelerated endowment plan, as originated by the Mutual Benefit Life Insurance Co., of Newark, New Jersey. Assets, \$30,533,429.94. Lewis C. Grover, President; J. Spencer Noble, Vice-President; Benjamin C. Miller, Treasurer; Edward A. Strong, Secretary; Bloomfield J. Miller, Actuary. Send for circulars to James Munsell, Jr., agent of insured, 224 Sansome St., San Francisco.

Mr. W. J. WOONLEY, who took out a Canadian Patent some four years ago, is requested to call at the MINING AND SCIENTIFIC PRESS PATENT AGENCY OFFICE. Business of importance.

MONEL MAKER AND MACHINIST.—I. A. Heald, No. 514 Commercial St., San Francisco (fourth floor).

Signal Service Meteorological Report.

Week Ending June 11, 1878.

HIGHEST AND LOWEST BAROMETER.						
June 5	June 6	June 7	June 8	June 9	June 10	June 11
29.82	29.02	29.07	29.91	29.85	29.82	29.87
29.76	29.85	29.91	29.85	29.82	29.79	29.81
MINIMUM AND MAXIMUM THERMOMETER.						
67	64	60	65	66	65	63
51.5	52	53	53	54	53	53
MEAN DAILY HUMIDITY.						
81	70	82	80	75	71	68
PREVAILING WIND.						
SW	SW	SW	SW	SW	SW	SW
WIND—MILES TRAVELED.						
240	333	323	277	230	302	368
STATE OF WEATHER.						
Cloudy	Cloudy	Cloudy	Fair	Clear	Fair	Fair
RAINFALL IN TWENTY-FOUR HOURS.						
		.01				
Total rain during the season, from July 1, 1877, 35.18 in.						

GENERAL MERCHANDISE.

[WHOLESALE.]

WEDNESDAY M., June 5, 1878.

RAGS—Jobbing.		Plaster, Golden	3 00 @ 3 25
Eng Standard Weight, 11½ @ 11½		Oate Mills, 10 00 @ 12 50	
Norfolk & Co's		Land Plaster, 10 00 @ 12 50	
Hand Sewed, 22x36, 11½ @ 11½		PAINTS.	
24x36, 11½ @ 11½		Pacific Glue Co's	00 @ 90
24x48, 11½ @ 11½		Neafus, No 1, 00 @ 90	
Machine Sewed, 22x36, 11½ @ 11½		Castor, No 1, 10 @ 10	
Flour Sacks, 48x60, 6 @ 6		do No 2, 05 @ 10	
Quarters, 48x60, 6 @ 6		Baker's A A, 25 @ 30	
Elgiths, 48x60, 4 @ 4		Olive, 1½ @ 10	
Hessian, 60 inch, 15 @ 15		Possel, 47 @ 75	
45 inch, 21 @ 21		Palma, 47 @ 75	
40 inch, 24 @ 24		Linsed, Raw, 72 @ 72	
Wool Sacks,		Bolled, 75 @ 75	
Hand Sewed, 34 lb, 47½ @ 50		Cocoanut, 55 @ 55	
4 lb do, 52½ @ 52½		China nut, 68 @ 70	
Machine Sewed, 47½ @ 47½		Sperma, 60 @ 65	
Standard Ouncies, 14 @ 15		Coat Whales, 60 @ 65	
Bean Bags, 7 @ 8		Polat, refined, 60 @ 60	
CANDLES.		Lard, 10 @ 15	
Crystal Wax, 17 @ 17		Ovee's Bril, 27½ @ 28½	
Engle, 12 @ 12		Photolite, 29 @ 29	
Patent Sperma, 30 @ 34		Nonparil, 50 @ 50	
CANNED GOODS.		Sardines, 40 @ 43	
Assorted Pie Fruits,		Barrel, 20 @ 20	
24 cans, 2 75 @ 3 00		Downer Ker, 40 @ 42½	
2 lb do, 3 75 @ 4 25		Elaine, 42½ @ 42½	
Jaun and Jellies, 4 25 @ 4 25		PAINTS.	
Pickles, 1½ gal, 3 50 @ 3 50		Pure White Lead, 91 @ 101	
Sardines, 1½ gal, 1 65 @ 1 90		Purty, 14 @ 14	
Hf Boxes, 3 00 @ 3 00		Chalk, 11 @ 11	
Peared Beef, 4 00 @ 4 00		Paris White, 2 @ 2	
2 lb doz, 4 00 @ 4 00		Ochre, 3 @ 3	
Do, 4 lb doz, 6 50 @ 6 50		Green, 3 @ 3	
Preserved Mutton,		Averil Mixed	
2 lb doz, 6 50 @ 6 50		Paint, gal,	
Preserved Ham,		White & Blue, 2 00 @ 2 40	
2 lb doz, 6 50 @ 6 50		Ch Yellow, 3 00 @ 3 50	
Doviled Ham, 1 lb,		Light Red, 3 00 @ 3 50	
do, 2 lb, 50 @ 50		Metallic Roof, 30 @ 60	
do Ham 1½ doz, 3 00 @ 3 00		RICE.	
COAL—Jobbing.		China No 1, 1 lb, 61 @ 61	
Australian, ton, 7 00 @ 7 25		Hawalan, 61 @ 7	
Costa Rica, 6 50 @ 7 00		SALT.	
Gustamala, 6 50 @ 7 00		Cal Bay, ton, 15 00 @ 22 50	
Seattle, 5 50 @ 5 50		Common, 10 00 @ 12 00	
Cumberland, 14 00 @ 14 00		Carmen Id., 13 00 @ 22 50	
Do Diablo, 4 75 @ 6 00		Liverpool fine, 20 00 @ 22 50	
Lehigh, 22 00 @ 22 00		SOAP.	
West Hartley, 7 50 @ 8 00		Castle, 10 @ 10½	
Scotch, 6 50 @ 8 00		Common brands, 4½ @ 6	
Scranton, 13 00 @ 16 00		Fancy brands, 7 @ 8	
Vancouver Id., 7 00 @ 7 00		SPICES.	
Oakdale, sack, 75 @ 75		Cloves, B, 45 @ 50	
Oake, 60 @ 60		Cassia, 24 @ 25	
COFFEE.		Nutmegs, 85 @ 90	
Sandwich Id, B, 21½ @ 21		Pepper Grain, 15 @ 17	
Costa Rica, 18½ @ 18½		Pimento, 15 @ 16	
Gustamala, 16 @ 18		SUGAR, ETC.	
Java, 18 @ 18		Cal Cube, 11½ @ 11½	
Manila, 18 @ 18		Powdered, 12 @ 12	
Ground, in cs, 25 @ 25		Fine crushed, 11½ @ 11½	
FISH.		Golden O, 11½ @ 11½	
Sack Dry Cod, 5 @ 5½		Cal Syrup, kgs, 70 @ 70	
do 1 case, 8 @ 8		Hawaiian Molasses, 26 @ 30	
Eastern Cod, 8 @ 8		TEA.	
Salmon, bbls, 9 00 @ 10 00		Young Hyson, 35 @ 50	
Hf bbls, 5 00 @ 5 50		Moynse, etc, 35 @ 50	
2 lb cans, 3 10 @ 3 20		Country pked Gun-	
Pick Cod, bbl, 20 @ 20		powder & Im-	
Hf bbls, 11 00 @ 11 00		perial, 50 @ 50	
Mackerel, No 1, 11 00 @ 12 00		Mustard, 40 @ 35	
Hf Bbls, 11 00 @ 12 00		Food-Chow O, 53 @ 60	
Ex Mch, 3 50 @ 4 50		Japan, 1st quality, 40 @ 60	
Pick Herring, 3 00 @ 3 50		2d quality, 25 @ 35	
Boston Smk Hg, 40 @ 50		METALS.	
LIME, ETC.		WHOLESALE.	
Lime, Sta, 2 00 @ 2 25		WEDNESDAY, M., June 5, 1878.	
Oement, Rosen-		IRON.	
dale, 2 75 @ 3 50		American Pig, ton, 28 00 @ 30 00	
Portland, 4 75 @ 5 50		Scotch Pig, ton, 28 00 @ 30 00	
		White Pig, ton, 28 00 @ 30 00	
		Oregon Pig, ton, 28 00 @ 30 00	
		Refined Bar, 21 @ 31	
		Horse Shocs, keg, 5 00 @ 5 00	
		Nail Rod, 17 @ 17	
		Norway, Oval, 17 @ 17	
		COPPER.	
		Sheathing, B, 34 @ 35	
		Sheathing, Yellow, 12 @ 12	
		Sheathing, Old Yellow, 12 @ 12	
		Composition Nails, 24 @ 24	
		Composition Bolts, 24 @ 24	
		STEEL.	
		English Cast, B, 13 @ 14	
		Anderson & Woods, ordinary sizes, 15 @ 15	
		Drill, 15 @ 15	
		Flat Bar, 14 @ 19	
		Flow Steel, 8½ @ 12½	
		T. & P. L.	
		10x14 I C Charcoal, 7 50 @ 8 50	
		Banca Tin, 23 @ 24	
		Australian, 17 @ 17½	
		ZINC.	
		By the Cask, 9 @ 9	
		Zinc Sheet 7x3 ft, 7 to 10, lb, 9 @ 10	
		7x3 ft, 11 to 14, 10 @ 10	
		8x4 ft, 8 to 10, 11 @ 11	
		8x4 ft, 11 to 10, 11 @ 11	
		NAILES.	
		Assorted sizes, 3 15 @ 3 25	
		QUICKSILVER.	
		By the lb, 43 @ 45	
		LUMBER.	
		WEDNESDAY M., June 5, 1878.	
		CARGO PRICES OF PUGET SOUND PINE.	
		REDWOOD.	
		Rough, M., 18 00 @ 18 00	
		Refuse, 9 00 @ 9 00	
		Clear, 23 00 @ 23 00	
		Clear Refuse, 13 00 @ 13 00	
		Rustic, 23 50 @ 23 50	
		Refuse, 15 00 @ 15 00	
		Surfaced, 20 00 @ 20 00	
		Refuse, 14 00 @ 14 00	
		Flooring, 20 00 @ 20 00	
		Refuse, 15 00 @ 15 00	
		Beaded Floor, 15 00 @ 15 00	
		Refuse, 13 00 @ 13 00	
		Half-inch Siding, 16 00 @ 16 00	
		Refuse, 14 00 @ 14 00	
		Half-inch Surfaced, 20 50 @ 20 50	
		Refuse, 14 00 @ 14 00	
		Half-inch Battens, 16 00 @ 16 00	
		Refuse, 14 00 @ 14 00	
		Pickets, Rough, 11 00 @ 11 00	
		Rough, 12 50 @ 12 50	
		Fancy, Pointed, 15 00 @ 15 00	
		Shingles, 1 75 @ 1 75	

REDWOOD.		Rough, M., 18 00 @ 18 00	
REDWOOD.		Refuse, 9 00 @ 9 00	
REDWOOD.		Clear, 23 00 @ 23 00	
REDWOOD.		Clear Refuse, 13 00 @ 13 00	
REDWOOD.		Rustic, 23 50 @ 23 50	
REDWOOD.		Refuse, 15 00 @ 15 00	
REDWOOD.		Surfaced, 20 00 @ 20 00	
REDWOOD.		Refuse, 14 00 @ 14 00	
REDWOOD.		Flooring, 20 00 @ 20 00	
REDWOOD.		Refuse, 15 00 @ 15 00	
REDWOOD.		Beaded Floor, 15 00 @ 15 00	
REDWOOD.		Refuse, 13 00 @ 13 00	
REDWOOD.		Half-inch Siding, 16 00 @ 16 00	
REDWOOD.		Refuse, 14 00 @ 14 00	
REDWOOD.		Half-inch Surfaced, 20 50 @ 20 50	
REDWOOD.		Refuse, 14 00 @ 14 00	
REDWOOD.		Half-inch Battens, 16 00 @ 16 00	
REDWOOD.		Refuse, 14 00 @ 14 00	
REDWOOD.		Pickets, Rough, 11 00 @ 11 00	
REDWOOD.		Rough, 12 50 @ 12 50	
REDWOOD.		Fancy, Pointed, 15 00 @ 15 00	
REDWOOD.		Shingles, 1 75 @ 1 75	

REDWOOD.		Rough, M., 18 00 @
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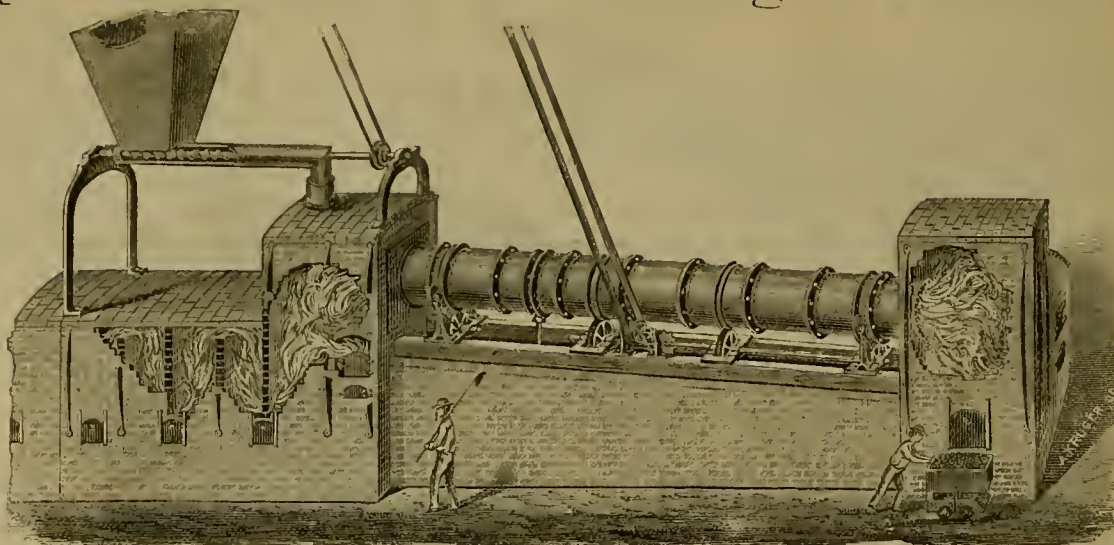
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An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, JUNE 22, 1878.

VOLUME XXXVI.
Number 25.

The Rigby Governor.

We illustrate herewith an improved governor for steam engines, recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by James A. Rigby, of Carson City, Nevada. It may be applied to any engine, but is more particularly intended for those that are subjected to severe and sudden changes in the resistance to the power they supply.

The invention consists in a novel construction of the main governor valve, and in combination with it, an operating engine, the valve of which is controlled and the admission of steam regulated by a revolving ball governor. This governor is mounted on a spindle having a pulley in its center, and which is driven by the frictional contact of another pulley, and the latter pulley is so mounted that the breakage of a belt allows it to immediately swing out of contact with this first pulley. A spring upon the governor spindle then acts to draw it back and with it the valve stem and valve, so as to shut off steam from its cylinder, and this allows the main steam valve to be closed, so as to stop the engine or reduce the speed.

This is in brief the method of operation, the details being shown in the engravings, of which Fig. 1 is a view of the governor, and Fig. 2, a section of the valve, globe, operating cylinder and valve chamber.

A is the main valve chamber, having steam ports, B, B, and a passage for steam around the outside of the vertical valve seat. C is the main steam valve, made with two pair of wings, to act as a counterbalance to the draft of steam when the valve is open, as the steam, in passing from the valve chamber, has a tendency to make the valve cover the ports. D is the main valve stem, turning in a step at bottom and it extends out through the top, having a vibrating crank, E, secured to its upper end. This crank is moved by means of a crank pin and sliding box, F, that is secured to the end of a piston rod of the small engine, a governor cylinder, G. Steam is admitted into this cylinder by a piston valve, H, which is perfectly balanced; but a rotary or any other form of valve might be used. The valve in the present case is operated by a small revolving ball governor, having spiral springs, I, I, arranged as shown, for the purpose of overcoming the centrifugal force of the balls. These springs are attached to the governor ball by thumb screws, K, K, and can be tightened or loosened to increase or diminish the speed of the engine at will. The stem of the valve, H, has a deeply grooved wheel or pulley, J, upon the end and the arm, J', extend inwards from this angle at which they, as a part of the bell-crank governor arms, are pivoted, so that their ends are retained in the groove, as shown; and as this ball and spindle revolve, they will revolve within this groove, and by their action they will move the valve backward and forward.

The valve stem is prevented from rotating by means of a pin, N, which extends from the wheel, J, into a hole in the end of the valve chest, or metal of the cylinder, so that the wheel and valve stem will not be rotated by the action of the rotating arm, but will only receive from it a reciprocating motion.

The governor balls are small and rotate rapidly, being driven by a pair of friction wheels, L, L', held in contact by the governor belt, in such a manner that when the belt breaks or becomes slack, the lower wheel swings free from the upper, being mounted on a crank arm, R, so as to allow the upper wheel to be pushed away from the standard supporting the governor by a spiral spring, M, on the governor spindle. This lowers or pushes the ball governor and its spindle so far back as to close the valve, H, of the governor cylinder, thus producing a simple and perfect stop motion.

N' is a metallic finger at the end of the piston rod that runs a shafting bar, and by an automatic movement shifts the governor belt on the cone pulley, P, thus increasing or diminishing the motion as required, and by its own action. It will be seen that when the pulleys, L, L', are out of contact, the pressure of the spring, M, forces the pulley, L', out of line with the pulley, L, and thus draws the governor spindle, and, by means of the arms, J, the valve stem back, so as to close the valve. When the pulleys are

brought into contact, their V-shaped grooves and edge serve to draw the pulley, L', into line, and of course this compresses the spring, M, and moves the spindle and valve stem so as to open the valve, H. This admits steam to the cylinder, G, and moves its piston so as to turn the crank arm, E, and this turns the valve, C, so as to open it. The action of the governor balls is then transmitted through the arms, J, to the valve, H, and the amount of its opening, and through it, that of the main valve is determined.

The inventor overcomes the tendency of the governor to overact in several ways. First, by using very small induction ports to the governor cylinder, so that a little vibration of the governor balls shuts off the steam from the governor cylinder. The port is governed and its size reg-

ulated by a screw which operates to enlarge or diminish the size of the openings, and this prevents to free an admission of steam to the cylinder, G, which would open the main valve, C, too suddenly. Secondly, by a spring bumper, Q, arranged as shown. When the engine has arrived at the requisite speed and the main steam valve is about half way closed, the said spring bumper will act immediately and cause the valve to begin opening. It also shuts off the steam from the governor cylinder by acting upon the shifting bar above described and the belt on the cone pulley, P, so as to prevent the engine from running above speed when relieved of its work. This spring bumper, however, is only required when the main valve is balanced, and has a tendency to close of itself. Thirdly,

in use there are experimental ones, and not satisfactorily made, but the inventor considers that by their use he is enabled to cut out 10,000 feet at each mill more than it would be possible with any other. For further information address the inventor as above.

CASA DIABLO.—On the road from Benton to the new Lake mining district is a singular spring of boiling mud called the Casa Diablo. The spring is about 10 feet in diameter and it is filled with mud that is constantly boiling and bubbling. When a pole is thrust into it the spring spits and sputters furiously for a time as though to resent the stirring up. At times

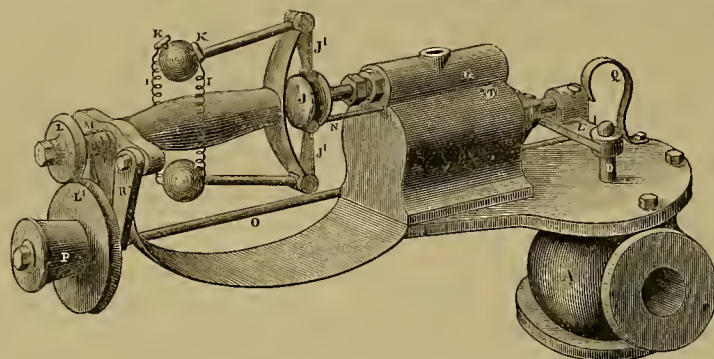


FIG. 1. THE IMPROVED RIGBY GOVERNOR.

this spring is said to spout mud to the height of 20 or 30 feet, spattering the ground in all directions and sending down the slope on which it stands quite a brook of steaming slum. Near the mud spring is a spring of hot water about five feet in diameter. In the center of this a column of water constantly boils to the height of about two feet, with a rippling noise that can be heard to a considerable distance. From this spring flows a stream of about 10 inches of boiling hot water. From the mud spring nothing flows, except when it takes one of its tantrums. These springs are about five miles from Lake district. A man who thinks he sees a fortune in the springs has located them, is building a house near them and claims that between them they are more than a match for all the ills that

the ill-odored waters of the Comstock. —Assistant Superintendent Patton, of the Bonanza mines, has sent a demijohn of water taken from the bottom of the Ophir 1900 level winze to San Francisco for analysis. It is supposed to contain minerals of various kinds leached out of the ore and rock of the vein. When it stands for a short time in the bottom of the winze—that part below the 2000 level being at present used as a sump—a thick green scum rises upon it. Its odor is very offensive. When a few buckets of it have been hoisted the exhalations from it load the air and sicken the men. Mr. Patton is of the opinion that the water, which is very hot, may be found to contain some silver, leached out of the chloride contained in the ore. Whether or no it contains silver it is of interest to ascertain just what minerals there are in it to give it an odor so disgusting, and to cause it to throw up the green scum. The water found on the 2000 level of the Julia appears to be of the same kind.—*Territorial Enterprise*.

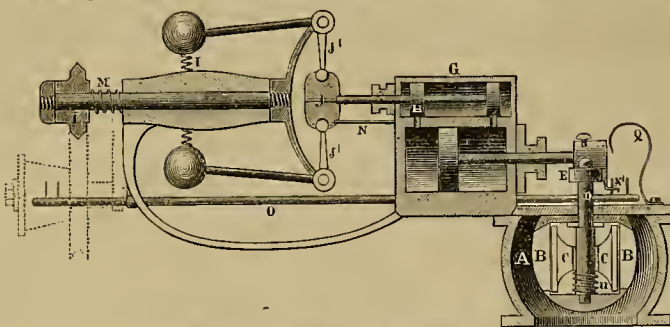


FIG. 2. SECTIONAL VIEW OF RIGBY GOVERNOR.

by a light spring that will open the main a little more than is sufficient to keep the engine at speed when running light. An elliptical pulley is also used on the main shaft for the governor belt, which gives a slight vibratory motion to the balls, thus tending to prevent the piston of the governor cylinder from going too far either way.

Mr. Rigby writes from Glenbrook that the sawmills are doing better than ever before, and cutting out about 200,000 feet per day of 12 hours, with three mills, one set of saws each. This is pretty good work. In two of the mills the power is quite limited, one having two engines 12x24, and the other one 16x20. The engines are made the most of by the governors above described, and where they are used a better power is gained than with the other engine (18x48) with another style of governor, all carrying steam at 95 pounds, and cutting off at about three-quarter stroke. The new governors

flesh is heir to. These springs are situated in Mono county, California.

NEW PAVEMENT FOR SLUICES.—The Eureka Lake mining company have purchased 45 tons of railroad rails to be tried as an experiment as "blocking" in their flumes in lieu of the cobble stones and wooden blocks heretofore used. Several of the hydraulic companies operating near the line of the Central Pacific railroad have for some time past been using the worn-out rails bought of the company for paving their sluices, finding them cheaper than wood or stone on account of their greater durability. The above is, however, the first instance that has come to our knowledge of parties buying rails to be used at so great a distance from the line of the railroad.

A COMPANY has been formed with a capital stock of \$340,000 to bring water into the city of San Jose.

A New Kind of Artificial Stone.

Messrs. Hopper & Evans, of this city, have applied through the Agency of Dewey & Co. for a patent combination of materials for the composition of artificial stone; an article that promises to come largely into use in the construction of buildings, roofs, floors, sidewalks, pavements, and the various other purposes for which artificial stone can be advantageously employed. The points of especial excellence claimed for this new substance are its imperviousness to water, resistance to heat, durability, healthfulness and economy. According to the description it does not crack with age or exposure to the sun, tends to preserve the wood and other materials to which it is applied, remains hard on exposure to heat, can be easily repaired, removed and renewed, and when put in place sets and hardens in a short time. On the assumption that it possesses the above properties, this article must speedily find favor with builders, artists, manufacturers, and the general public. For sidewalks and street pavements it will be very likely to supersede the use of asphaltum, as it can be made slightly yielding, thereby securing the advantages of that substance, while it neither melts nor cracks, its manufacture being attended with no smoke or disagreeable smell. The inventors will soon have their new stone on the market, such practical trials having already been made of its qualities as establish both its utility and cheapness.

THE ILL-ODORED WATERS OF THE COMSTOCK. —Assistant Superintendent Patton, of the Bonanza mines, has sent a demijohn of water taken from the bottom of the Ophir 1900 level winze to San Francisco for analysis. It is supposed to contain minerals of various kinds leached out of the ore and rock of the vein. When it stands for a short time in the bottom of the winze—that part below the 2000 level being at present used as a sump—a thick green scum rises upon it. Its odor is very offensive. When a few buckets of it have been hoisted the exhalations from it load the air and sicken the men. Mr. Patton is of the opinion that the water, which is very hot, may be found to contain some silver, leached out of the chloride contained in the ore. Whether or no it contains silver it is of interest to ascertain just what minerals there are in it to give it an odor so disgusting, and to cause it to throw up the green scum. The water found on the 2000 level of the Julia appears to be of the same kind.—*Territorial Enterprise*.

NEW LAKE DISTRICT.—Concerning this district lying near Mono lake and now attracting some attention, the *Bodie Standard* says: The district is a little west of south from Bodie, and distant 55 miles. A wide porphyry and slate formation runs through the mountains, on the east and west sides of which the mines are situated. The rock appears to be very hard, and a peculiar feature is that high up on the west side of the bluff or mountain the ledges are all free milling ore, while those low down on the east are base metal. On the west are the Mammoth, Headlight, Grank Cash, Monumental, Dennis Kearney, Flying Cloud, Alpha and Jordan; and on the east, North Star, Ajax, Mono Lake City, Last Chance, Gazelle, Don Quixote, Silveropieris, Savage and Rice. The Mammoth and Headlight were recently purchased by General Dodge, M. Lambreth and others of San Francisco, who will put up a 20-stamp mill right away.

The largest solid gold nugget yet taken out of a Black Hills mine was lately taken from the bottom of the 20-foot shaft of the Consolidated American Flag Palmetto mine at Lead City. It had scarcely a particle of quartz mixed with it, and weighed 34½ ounces. The mine was some time ago bonded by New York parties for \$110,000.

The little steamer of Captain Holmes plying on Walker lake is a real success, and is doing a thriving business. At present considerable freighting is being done to the southern part of Esmeralda county, and nearly all of it is by way of Walker lake.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Mining in El Dorado County.

[From our Traveling Correspondent.]

A hasty run has just been made to that portion of the county lying between the South and Middle Forks of the American river. Many changes have taken place here within the past two years. Mines then worked now lie idle, some probably abandoned for years to come; while new discoveries and new developments have to some degree taken their place. Taken as a whole, the quartz interest may be said to quiet as compared with former years. The St. Lawrence, the Rosecrans, the Taylor, the Slinger, the Woodsie and several other once promising quartz mines, are all shut down; but the day will doubtless come when some of them will be reopened and worked with profit. More attention than usual has been given the past season to gulch and hill diggings. Many have made fine wages at points hitherto little prospected, and where the presence of gold in paying quantities was scarcely suspected.

Among the late sensations in quartz the Smith Bros., in the neighborhood of Greenwood,

Have found, from all accounts, a veritable bonanza. At any rate it is looked upon by the owners as one of the greatest discoveries ever made in the county. The ledge is reported to be 50 feet in width on the surface, the quartz carrying and showing gold from foot to hanging wall, and pretty evenly distributed throughout. It has been worked all the past winter, the quartz being wheeled out and the fine dirt sluiced, using eight inches of water, and it is said to have paid them handsomely, as high as \$40 being pounded out in a small hand mortar within a couple of days. This process being considered too slow, a 10-stamp mill is now going up under the supervision of Mr. H. G. Malthy, who is understood to have recently secured an interest in the mine. About 400 feet from where they are now at work and at a depth of 350 feet, the ledge crosses Georgetown canyon, at which point it is 14 feet wide and prospects equally well, from all of which it must be apparent that they have reason to be jubilant.

Mr. John Cedarburg has also made a quartz location recently about two miles from the old Cedarburg (of rich specimen notoriety) which bids fair to be of a more permanent character than the one destined to transmit his name to posterity.

The old Rice claim at

Spanish Dry Diggings,

Worked the past nine years by F. Ricci & Co. and always paying fair wages, is reported, just at this time, as doing splendidly. The gold is found in small quartz seams, which is a characteristic of the mines of this and some of the adjoining districts. The claim is very extensive, sufficiently so it is thought to give the company work for 75 years to come.

Mr. L. Sites has taken from one of his claims, the Pennsylvania, some rare and beautiful specimens of pure wire silver adhering to the gold or in close juxtaposition with the same, a fact so unusual for California, or even for the Coast, as to be thought worthy of mention.

Quartz at Kelsey.

The Ida Livingston, encased in talcose slate, is opened by prospecting shaft to depth of 80 feet. From wall to wall it may be four and a half feet, but somewhat mixed with slate which is highly charged with sulphurets carrying gold. The main body is fair milling ore, varying from \$12 to \$30, and some of it running as high as \$600 per ton—some of the richest of the vein matter consisting of tellurium. The mine is at present under the superintendence of Col. A. W. Burrell, and gives good promise of success.

The Chapparral, owned by Messrs. Poundstone, Condo and Leach, has resumed work. They have put up a whim and reached a depth of 80 feet, drifting south 65 feet on the ledge. The rock mills \$30 per ton. As soon as the mine is sufficiently developed to seem to justify it, a mill will be erected.

Mines Around Georgetown.

Immediately on the border of the town, Winslow & Co. are daily finding gold, from the decomposed quartz and occasionally a very fine specimen. They use the hydraulic and occupy ground from which between \$30,000 and \$40,000 had been taken from the surface. Their prospect is considered promising. Messrs. Judkins and Welden have recently purchased and are successfully working the rich seam and pocket claim which panned out so well last fall.

The claims at Georgia slide are doing a good average business, in fact it may be looked upon as one of the best districts in the county. Since the place was visited two years ago, Mr. S. Hausen has erected hoisting works run by water and sunk a perpendicular shaft 65 feet; drifting during the time 200 feet north along the ledge, in the meantime paying expenses. The whole of the rock as it comes from the ledge is crushed and has been paying him remarkably well the past two months—the yield for the last four weeks being about \$800. He

has sufficient ground prospected to last five years.

The Golden State,

On Jones' hill, four miles from Georgetown, has been opened to the depth of 150 feet by a tunnel and drift of 60 feet along the ledge, showing now a width of two and a half feet. Several small seams or feeders are found near the surface which appear to be approaching each other as they descend, giving promise of union at a greater depth. A five-stamp mill was erected many years ago, run by water, the money to build being supplied by pounding out the gold in a hand mortar, and the mine is represented to have paid from the start. The last crushing of only four days' run is said to have yielded nearly \$3,000. The mine is owned and worked by Messrs. Jones, Armstrong & Hall, and while putting money in the pockets of the company, is a great credit both to them and the county.

Volcanoville.

The old McGregory, a hydraulic claim, is run by Mr. M. D. Fairchild with a full force. A big blast lately did fine execution. Much is expected from it under its present management. The Volcano mining company are said to be running a drain tunnel which will tap the ledge at a depth of 400 feet from the surface. The New Year's company have taken out a small quantity of quartz near the surface that worked \$17 per ton. The ledge is two feet thick, the quartz looking well at the foot of incline 30 feet. They are now crushing some quartz taken out at this point, the results of which are promised you as soon as ascertained. More anon.

A. C. K.

Notes on Amador County.—No. 2.

[From Our Traveling Correspondent.]

The Keystone Con. Mine.

This property is situated at Amador City, two miles north of Sutter Creek, and is perhaps one of the most extensive and best paying gold quartz mines in the world. There are two shafts on the mine. The main working shaft is 815 feet deep, and the south shaft, distant 433 feet, is 550 feet deep. These shafts are connected by drifts on three levels, which keep the mine well ventilated and greatly facilitates exploration and ore extraction. The vein here bears the general characteristics of the mother lode, except that in this mine it is much wider than at most other points, being at one place 300 feet from wall to wall. Yield, about 100 tons of ore per day, which is reduced by a 40-stamp mill adjoining the mine. They use here 22 of Hendy's concentrators for saving the sulphurets, of which they clean up and send to chloridizing works about 50 tons per month, which yield on an average \$100 per ton. The cost of mining and milling the ore is about \$5 per ton. The gross yield \$16 per ton, besides the sulphurets. Bullion shipped last month, \$32,383.83. They have on their pay roll 120 men—wages, \$2.50 to \$3 per day. The company is incorporated in San Francisco, the stock being owned principally by Capt. James McDonald and A. B. McCreary. The whole business here is under the superintendence of Mr. O. C. Hewitt.

The Original Amador.

This mine, owned by the London and California mining company, is situated a few hundred feet north of the Keystone, being like it located on the mother lode. Six shafts have been sunk on the mine, averaging in depth about 800 feet. The mine is being thoroughly prospected, several levels of very good ore having been opened. There are two parallel veins lying close together, each so far having maintained its individuality. The hoisting power is situated 1,000 feet from one of the working shafts, and 700 feet from the other. The top of one shaft is 250 and the other 170 feet higher than the engine—the latter being at the foot and the shafts on the hillside above. By this arrangement a saving of about 40% in power is effected. Connected with this mine is a 40-stamp mill with all the modern conveniences for saving gold and sulphurets. The resident Superintendent is Mr. J. R. Johns.

The Bunker Hill Mine

Is situated on the same lode and immediately north of and adjoining the Con. Amador. The shaft here is 350 feet deep. Average width of ledge, eight feet; average pay of ore, \$12 per ton. This mine is owned by Wales L. Palmer, of Miners' foundry, San Francisco. It has a 10-stamp mill to which the ore is conveyed by a tramway. Six Hendy's concentrators are used to save the sulphurets. John Palmer, Superintendent.

The Gover Gold Mine,

Next in this series, is located about one mile north of Amador City, near the new mining town of New Chicago. The owners have put down one shaft to a depth of 750 feet, and are sinking another now down 600 feet. The average width of the ledge is about three feet, although there are places where it is much wider. A 20-stamp mill, 10 Hendy's concentrators, and all the appliances required for saving the gold and sulphurets have been provided. John Palmer, Superintendent, says the prospects of the Gover becoming a first-class gold-producing mine are good. This company is incorporated in San Francisco.

The North Gover,

Adjoining the property just described, has just

commenced prospecting the ledge. Shaft down 170 feet. Hoisting works just erected are run by water power. The company is incorporated in Amador City, where all the stock is owned; R. M. Ford, President. The stockholders seem to feel that they have a good property here.

California Potosi.

This mine is situated about half way between the Gover and the Phenix, and was formerly known as the Potosi. It was located and worked more than 20 years ago, but for want of capital to put up the necessary machinery was permitted to lie idle by the owners until 15 months ago, when it was purchased by the present Superintendent, John Tregloan, at a cost of \$18,000. The company is incorporated, and 15,000 shares of the 65,000 of which the capital stock consists, has been set aside as a working capital. This was afterward sold, realizing \$14,000, which was invested in a first-class 10-stamp mill, just completed, and furnished with Hendy concentrators, Hendy feeders and a quicksilver saving apparatus. The mill is run by 35 inches of water, under a pressure of 300 feet—Knight's water-wheel. Of the concentrators and feeders Mr. Tregloan speaks highly. The hoisting is now done by steam, but it will soon be changed to water power, using Knight's double water-wheel, with two nozzles, enabling the engineer to shut down or reverse as quickly as with a steam engine. To lead the water to the mine and mill 2,000 feet of 15-inch boiler-iron pipe is used. The ore-car is taken as it comes out of the shaft by the engineer, who is also dump tender, and rolled to the mill, a distance of 200 feet, and emptied into the ore dump, which serves also as a hopper to the feeders, thereby saving one hand. The working shaft here is down 250 feet, run in the foot-wall or slate, 20 feet west of the vein; size, 8x4½ feet. Quite a number of drifts and crosscuts have been run, exposing a large body of ore, which will mill from \$6 to \$8 per ton. They expect to mine and mill 18 to 20 tons per day.

Phenix Mine and Mill Company.

This property, owned by Alvinza Hayward, is situated at the town of Plymouth, Amador county, and contains 1,900 feet on the mother lode. It is worked and the ore raised from two shafts, 300 feet apart. The south shaft is 1,100 and the north 1,230 feet deep. These shafts are connected underground by drifts at the 900, 1000 and 1100 levels. The average width of the ledge, in three drifts south from the south shaft, is 33 feet. At the 1000 level and 280 feet south of south shaft, the ledge, in face, is 42 feet seven inches wide. At the 1100 level, 115 feet south of south shaft, the ledge in face is 33 feet wide. The mine is substantially timbered with round pine and hemlock timbers, 16 feet long and from 16 to 30 inches in diameter. These timbers are floated down from the mountains through the canal, which supplies water to run the mill. This canal is taken out of the north and middle fork of the Cosumnes, about 25 miles east of the mine, and furnishes an abundant supply for the mill as well as water to irrigate the gardens and orchards in the town. The amount of timber used in this mine is very great, the immense piles of logs now at the mine reminding one of the log-yard of a saw-mill. They are raising here and milling about 110 tons ore per day. They use two National rock drills in this mine, worked by a double-cylinder air compressor, these drills having proved a great saving as well as a great success. The mill is under the superintendence of Mr. Charles Green, and the mine of W. T. Jones. The mill contains four sets of batteries of 20 stamps each, supplied with Tulloch's feeders. The gold is saved by amalgamating in the batteries and by the usual number of copper plates. The sulphurets are concentrated in long sluices, with riffles, and by six Cornish buddles, situated along the line of the sluices. These buddles are run by undershot water-wheels, placed in the tail-race from the mill. The sulphurets are taken from the buddles almost perfectly clean and assorted by skimming off the top of outer edge of the pile in the huddle, where the larger and heavier particles lodge. These sulphurets, which they denominate No. 1, will assay \$175 to the ton; No. 2, from \$100 to \$150. This mill is run by water-power, 500 inches under 80 feet pressure acting upon two of Leffell's 20-inch water-wheels. The production of bullion is from \$35,000 to \$40,000 per month. The mine and mill give employment to 105 men, the most of whom have families and live in handsome cottages in this pleasant village, their homes being surrounded with fruit and shade trees and beautified with flowers.

Bisulphid of Carbon.

[By Prof. L. LANSZWEERT.]

EDITORS PRESS:—Twelve years ago, having been severely victimized in the manufacture and use of this deleterious and explosive compound, I availed myself of the columns of your valuable paper, and on the 27th of January, 1866, appeared the first article of a monograph on bisulphid of carbon, which if you would have consulted would have saved you the expense of drawings of Peroncel's furnace and reference to *Dingler's Journal* in a recent number. The SCIENTIFIC PRESS of 1866 contains more details about this article and I must confess that since that time hardly any improvements have been made in its manufacture, although perhaps more in its rectification and application or uses. As this subject seems to attract some attention de

novo on this coast for the destruction of the phylloxera, rats, squirrels, and, in connection with the carbon motor, the following remarks to complete till date my monograph may not be amiss to some of your readers.

Galy, Cazalat & Huillard furnace (see MINING AND SCIENTIFIC PRESS of January 27th, 1866), would certainly be perfect if the combination of sulphur with carbon did evolve heat. Unluckily it is the contrary, heat being absorbed which necessitates the repeated renewal of air. Explosions don't take place, as the vapor of the bisulphid of carbon inflames before its mixture with the air, but a large quantity of sulphur is lost or only utilized as combustible. For these reasons perhaps that furnace is not in general use. Let us refer to the primitive apparatus, the ameliorations gained and its defects at the present state. If at the beginning clay retorts were generally used it was due to the over-estimated temperature necessary to the production of sulphid of carbon. The cast-iron retorts now universally used have 50 to 75 millimeters thickness, and when they are well sealed in the wall last several months, so that a retort weighing from 1,000 to 2,000 kilogrammes will produce over 20,000 kilogrammes of sulphid. During the operation the retort expands considerably, and is nearly transformed into a sulphid of iron, slightly soluble in diluted acids. If the sealing is not properly done, and the iron of poor quality, the retort will last only a few days. The size, form, and the number of retorts have been modified; retorts one meter of diameter and more than two meters high have been used, and from one to four have been sealed in the same wall; always in a vertical position; sometimes inclined, but never horizontal. The diameter should not be too great, not over four decimeters, as the temperature on the periphery would be too great and detrimental to the center; it would therefore be better to use the elliptic form, as described by Gerard, of Grenelle, in 1859 (see PRESS of January 27th, 1866).

The trials made by covering externally and internally cast-iron retorts with fire clay has not given satisfactory results, as the expansion of the iron is considerable, the clay infallibly must crack; perhaps enamelled iron retorts or of good plumbago would be more lasting. The present mode of manufacture necessitates further improvements not only for a larger yield, less expense in combustible, the avoidance of the rapid deterioration of the apparatus, but also for the salubrity of the laborer. The most notable feature since 1866 is the introduction of sulphur in the retorts, not in solid or liquid state, but in vapor.

As the charcoal and coke used are neither pure carbon, but, besides their ashes, contains oxygen and hydrogen, several foreign products are formed, specially sulphureted hydrogen, which lessens the production of sulphid of carbon, as it takes part of the sulphur, but emanates also charged with vapors of sulphid of carbon. This mixture is one of the most disagreeable to the laborers and neighborhood. The absorption of this gas by hydrated lime, proposed by Deiss, has not given satisfactory results. Not only sulphureted hydrogen, but other volatile products, which add to its nauseous odor are produced. The quantity of these gases augments in proportion to the oxygen, hydrogen and humidity contained in the coals, thus it is advisable to dry them before using them in the retorts.

The sulphid of carbon obtained, as already stated, is never pure and the crude article is seldom used. It contains 10% of sulphur, sulphureted hydrogen, besides other impurities formed by combination of the carbon, sulphur and oxygen, the presence of which is proven by the abundant evolution of gas during distillation and the loss in sulphid of carbon, which is 25%. By a simple distillation, even in redistilling the product 20 times, we do not obtain a pure product, which should leave no residuum by evaporation.

Boniere for his spicy extracts passes the vapors through solution of hydrate of potassium, salts of iron and copper. Seyffert obtains a good product by precipitating the vapors with a fine spray of cold water. Deiss purifies by the distillation with sodium, chlorine, water and a solution of chloride of calcium. Sidot advises to agitate the rectified sulphid with pure mercury. Cloez agitates it with 1/2 of sublimated corrosive and 2% of colorless grease. According to a report by S. Commaillie, Millon's process of purification consists to distill the sulphid with hydrate of lime and to preserve it on copper turnings, but Wittstein did not obtain satisfactory results with this process. A very pure sulphid is obtained by distilling it several times with pure oil. As long as the purification is not completed, the oil conserves a disagreeable odor and is charged with sulphur.

In your issue of June 1st, 1878, you say "Even the pure vapor is an anesthetic as powerful as chloroform, but the crude vapor, containing many other substances and possessing a very disagreeable odor, is a powerful poison, especially to all the lower animals." Relatively to these properties opinions are very much at variance. Richter, according to his experiences, considers the sulphid of carbon as little injurious to health, but others, with your humble servant, has recognized its dangerous attacks on the system in the most manifest manner. The most of those who respire during a certain time in an atmosphere containing vapors of sulphid of carbon, suffer of headaches, nausea, pain in the lower extremities, and finally a weakness of the physical and intellectual forces;

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MECHANICAL PROGRESS.

Wire Ropes and their Fastenings.

The increasing use of wire cable in mining and mechanical operations on this coast, makes investigations concerning them of much interest. A paper upon this subject was lately read by Mr. Gibson before the English Institute of Colliery Engineers, and therefrom we draw records of various experiments. Mr. Gibson says: I have come to the conclusion that the best quality is the cheapest in the end. I must confess that underground hauling ropes are liable to be damaged through due care not being taken. Then comes the question of the best ropes for that purpose. The difference of quality I have found to be very great indeed. We have upon our apparatus ropes which have been working 19 months; formerly we could only get ropes to last six months at the most, and some not more than four. The difference of cost is also remarkable. The rope working 19 months cost £110 per ton; the other cost £52 per ton. At Monkwearmouth colliery they have introduced flat steel ropes, and have taken about 25 cwt. off the weight; and I understand they are working very well. The size of the rope taken off at Monkwearmouth was the same as we have at Ryhope, viz., an iron rope six inches by three-fourth, weighing 40 pounds per fathom. I find, from experiments made at the Sunderland test works, that we have a very large margin on hand. The rope I refer to is a charcoal iron rope, six inches broad, three-quarters of an inch thick, and weighing about 40 pounds per fathom. The breaking strain, as shown on the manufactory cards, is about 72 tons. From experiments made, we have ascertained that we could not put on the end of the piece of rope tested, fastenings to bear more than 50 tons, the piece of rope being 18 feet long. We also tested new ropes with the same results, that is, the rope breaking at the socket. We found that the plain socket with rivets, such as we have working, was the best. The socket is a plain, ordinary socket, with 18 rivets, one-half of an inch diameter. The socket is 16 inches long and 6 inches broad, and the rope made ready for it. An iron hoop, 1 inch by 5-16, is put round the rope and fastened with a rivet. The hoop is put on about eight inches from the end, and the wire ends are doubled to give stability. The test was began at 10 tons and increased up to 50, when the rope gave way in the socket near the end rivets. Other tests of rope the same size gave the same results. A fastening with two iron plates, but open at the end, gave way near the bent of the small piece of iron at the top of the plates. The fastening gave way at 45 tons. The breaking strain on the manufacturer's cards gives 70 tons. We also tested a rope which had been at work for 12 months. We cut out of the middle of it the part tested, and put sockets on each end. The test showed the rope to be good, as it broke at the socket the same way as the other. It gave way at a strain of 50 tons. Now all these tests demonstrated clearly, I take it, that we have not arrived at a fastening to break a rope. We also tested round steel ropes with the ordinary socket with rivets, and sockets without rivets; in all cases the sockets with the rivets gave the best results. A five-eighth inch round steel rope, with the ordinary socket put on with rivets, broke at the socket with a test of five tons. The socket was without rivets, and the rope was drawn through the sockets at a test of three and one-half tons.

PAPER MAKING IN ENGLAND.—A lecture was delivered recently by Mr. William Arnot, F. C. S., of Edinburgh, on the manufacture of paper, at the rooms of the Society of Arts, London. It was generally admitted, he said, that the process of paper making was introduced into England about the beginning of the 15th century, and into Scotland at the end of the 17th century. The lecturer gave some interesting statistics relative to the trade. The number of mills in Great Britain was 385, of which 65 were in Scotland. There were in these mills 526 machines at work, producing annually 350,000 tons of paper, to which must be added 10,000 tons made by hand. The total production was thus 360,000 tons, valued at \$100,000,000. The exports of England amounted to 16,000 tons, while she imported 24,000. With respect to the consumption of paper in different countries, Mr. Arnot stated that in Russia the annual consumption was one pound per head of the population; in Spain, one and one-half; Mexico and Central America, two; Italy and Austria, five; France, seven; Germany, eight; United States, ten and a quarter; and Great Britain, eleven and a half.

THE STRENGTH OF WROUGHT IRON.—A series of experiments has been carried on at the Washington Navy Yard, by Commander L. A. Beardslee, of the United States Test Board, to ascertain the strength of iron used in chain cables. It had been suspected, with just reason, that the British Admiralty tables for the strength of wrought iron needed revision. Not less than 2,000 tests of the tensile strength of iron have been made at the Navy Yard, to determine the elastic limit, elongation, and reduction of area of the various specimens; and 42 complete chemical analyses have also been performed. Some of the conclusions which have been reached are remarkable. The admiralty

tables are declared unsafe, and new ones have been prepared. The Board finds that the tenacity of two-inch bar for chain cables should be between 48,000 and 52,000 pounds per square inch; one-inch bar, between 53,000 and 57,000; and that stronger irons than these make inferior cables, because they have less ductility and capacity for welding. The strength of wrought iron and its welding power are influenced quite as much by the reduction it has undergone in rolling as ordinary differences in its chemical composition. In general, the processes for making wrought iron give an uncertain quality to the product, while the methods of making cheap steel confer certainty and uniformity. The ordinary practice of welding is capable of great improvement, by being performed in an atmosphere freed from oxygen. The importance of the subject will be conceded, since the safety of human lives must often depend upon the strength of a ship's cable, or of the links in a bridge chain.

GLASS MILLSTONES.—Die Muehle states that Herr Meissner, of Thorn, Germany, has invented a crystal glass millstone. The inventor was led to construct this novelty from observing that French burrs produced the best results when they had the closest and most glassy nature. The manufacture of glass millstones is pursued on the same plan adopted in building French burrs. Eight pieces of glass of equal size, containing nine cubic meters, are used as nuclei, the counter piece of granite being kept open at the hole and bound to the outer form with cement. The furrows are cut with knife-picks and the dressing done with pointed hammers, though the inventor recommends the use of a diamond dressing machine. It is claimed that these glass millstones do better work than French burrs, running more easily, grinding cooler and producing finer and lighter flour. Thus far, only a few pairs of these novel stones have been put in actual use.

COAL LIFTER.—A very simple and effective apparatus for transferring coal from vessels to coal sheds, called an automatic railway, has lately been put in operation by a coal firm in Albany, N. Y. It consists of a narrow track on a frame work close under the roof of the shed, having a gentle incline towards the outer end, on which a car carrying one ton runs by its own gravity when loaded and is drawn back when empty by a weight at the inner end of the track. The car is filled by a quarter-ton scoop and a hoisting apparatus worked by one man and a horse. By this means a ton of coal can be transferred from the hold of a vessel to the shed in one minute, and the service of eight or nine men and two or three teams for several days for each boat is dispensed with.

QUICK WORK IN A BOILER SHOP.—The Jackson (Mich.) Patriot says: Last Monday, John McIntyre, with helpers, Richard Whalen, Andrew Connor, G. W. Updyke and C. M. Rutherford, in the Central boiler shops, began on six new boilers, to show how fast they could do work in that shop. They flanged the 12 inside fire-box heads, six front and six back, in 22 hours and 10 minutes, the 24 short corners, each requiring a separate heat, being made in two hours 10 minutes. They also flanged the six large outside or back-end heads, which had 108 feet of plate, with a nine-inch flange, in 21 hours. The steel was Cleveland rolled steel, part half-inch and part three-eighth inch. This job of boiler-building has never been equaled, or, if it has, no one seems to have ever heard of it.

ELECTRIC LIGHT.—The question of using the electric light for railway stations and warehouses has been investigated by several foreign railway companies, with very successful results. A London exchange now says: Experiments were made in the hall of the new terminus of the Berlin Stettin railway, with electric light produced by the new rotation apparatus of Mr. Siemens. The results were highly satisfactory. The light was splendid. Six such lights would be sufficient to light up the whole enormous building, and each of them would only cost two pence per hour. An outlay of 5,000 marks would be necessary for putting up the gas steam engine to work the cylinders necessary for each light. All the railway managers in Berlin were present at the experiments.

LAYING OUT GEARS.—S. W. Robinson, of Illinois, sends the following note to the Polytechnic Review: In accurately laying out small gearing, fine and positive lines are required. Black lines upon white paper are not to be compared with brilliant lines upon a dead-black surface. To secure the latter in the highest degree, a zinc plate is washed with a saturated solution of sulphate of copper in water, with one-tenth nitric acid. The zinc plate turns black immediately and forms a beautiful surface to lay out work upon when exceedingly fine lines are required. This process, so far as I am aware, is due to Mr. Oscar Beal, of Providence, R. I., examples of whose work I have had the pleasure of examining.

TO TURN CHILLED IRON.—At Lister's works, Darlington, England, some articles required turning in the lathe, and cast-steel could not be made hard enough to cut them. One man proposed cast-metal tools. He was laughed at, of course, but this plan had to be tried. Well, cast-metal tools were tried, with points chilled, and they cut when cast-steel tools were of no use. The article was turned up with metal tools.

SCIENTIFIC PROGRESS.

Chemical Geology.

One of the leaders in the foundation of the "new chemistry" is Prof. Thomas Sterry Hunt. During the quarter of a century he has labored in this field, he has done signal service in developing this science and in elaborating the beautiful theory which is now its ruling idea. In addition to this interior work, as it might be called, in the science, he has led in the advancement of chemistry as a handmaid of geology, and in doing this he has led the thought of the day to the acceptance of now and well fortified theories concerning the majestic forces which have given us the earth as we now find it. In view of these facts we deem it a matter of great satisfaction that Prof. Hunt has collected the results of his ripened scholarship and given us a volume of "Chemical and Geological Essays," which is a revision and expansion of his former work on this subject. It is published by S. E. Cassino, of the Naturalists' Agency at Salem, Mass. In a volume of about 500 pages, Prof. Hunt presents the advanced science of chemical geology; embracing the theory of igneous rocks and volcanoes, the chemistry of metamorphic rocks, the primeval earth, the origin of mountains, the chemistry of natural waters. He also presents points on dynamical and historical geology, notes on special rocks, the origin of metallic deposits and defines a work, in which he stands altogether pre-eminent, the tracing of the origin of crystalline rocks. In conclusion he gives chapters which demonstrate the leading theories in the new chemistry more clearly, concisely and conclusively than we have ever read before. Prof. Hunt's work will stand as a fitting monument to American scientific progress in the fields in which he has labored, and it is a progress of which every American can be justly proud.

DETECTION OF MINERAL ACIDS.—At a recent meeting of the English Chemical Society a paper was read "On the Detection and Estimation of Free Mineral Acids in Various Commercial Products," by Peter Spence and A. Esilman. The method, says *Iron*, is based on the fact that peracetate of iron, even in dilute solutions, has a distinct yellow color not perceptibly altered by acetic acid or solutions of persulphates, but instantly bleached by free sulphuric, hydrochloric and nitric acids. The solution is made by dissolving 10 parts of iron alum and 8 parts of crystallized acetate of soda, in 1,000 parts of an 8% solution of acetic acid (25%). The method is especially suited for alum cake, salt cake, etc. Two hundred grains of the sample are triturated in a mortar with the 8% solution of the acetic acid, and the peracetate solution added until the mixture has a decided yellow tint, showing that all the free acid has been neutralized. The liquid is then diluted to 100 measures with the acetic-acid water, and a portion filtered into a test-tube. In another test-tube as many measures of the peracetate solution as have been used for the above liquid are diluted up to about 80 measures of the acetic-acid water. Standard sulphuric acid is then run in until the color of the liquid is the same as that of the 100 measures in the first test-tube. The quantity of acid used is the measure of the free acid in the cake.

LIMIT TO SIZE OF TELESCOPES.—In a recent lecture, Prof. Benjamin Pierce, of Harvard University, adverted to the difficulties that attend the use of large telescopes. According to a report in the *Tribune*, he thinks that the instrument at Cambridge (15-inch refractor) has proved richer in results than the one at Chicago (18½-inch) or the Naval Observatory telescope (26-inch). Atmospheric disturbances interfere most with the larger instruments. There are only two or three nights in the year when the Cambridge telescope can be used to the best advantage, and Prof. Pierce thinks that a glass of 10 or 12 inches is more serviceable than a larger one. He is reported as saying that a good night for the Washington telescope can not be expected more than once in three or four years. If much larger instruments are constructed, they are not likely to be of service more than once in a century. These views seem exaggerated. It may well be doubted whether the moons of Mars or the companion of Sirius would have been found by means of the smaller instruments, though after the discoveries were made with the larger telescopes the faint objects were perceived and studied with inferior optical power. Perhaps as much depends, in the use of telescopes, upon the acuteness of vision and the industry of the observer as upon the size of the instrument, within certain limits.

GUNDLACH'S OBJECTIVES.—At the last meeting of the San Francisco Microscopical Society, a letter was read from Mr. Allan Y. Moore, of Tulare, in which he said: "I have recently resolved *surirella gemma* (dry) into longitudinal lines by a Gundlach's one-fifth objective (105"), with very oblique sunlight. That is almost too good to be true, isn't it? I have, however, a witness. The objective is owned by Dr. A. C. Stokes, of Trenton (N. J.), and is very good for the price, \$15." Mr. Ernest Gundlach has just, as we learn from an Eastern exchange, opened the manufacture of lenses on his own account, at Rochester (N. Y.), having broken his connection with another firm of opticians.

Measuring the Salt in the Sea.

At the recent meeting of the National Academy of Sciences at Washington, Prof. J. E. Hilgard, of the Coast Survey, described and exhibited an "optical ocean salinometer." The determination of the salinity of the sea at different depths and localities has become a matter of importance for scientific purposes. The difference of percentage of salt, away from the access of fresh-water streams, is so small as to be very difficult to measure. The ordinary areometer, which operates by floating, can not be delicately observed in a vessel which is tossing up and down at sea; having made a very good instrument of this sort, Prof. Hilgard is prepared to judge of its inadequacy. The suggestion has been made by Profs. Hassler and Gibbs that optical means could be used to meet the want. Prof. Hilgard showed an instrument made a long while ago with that principle involved. It was shaped like a sextant, which was expected to make it come handy to mariners; but in actual use it proved unsatisfactory. The new instrument is, in appearance, like a spectroscope with telescope attached. The sea water to be examined is poured into a triangular bottle, which takes the place of the prism in the spectroscope. Light is admitted through a slit made by covering with black vanish all except a narrow space in a lens, and a lamp can be placed before this slit, all parts being practically secure against shaking by the motion of a ship. Prof. Hilgard said that with this instrument a very regular scale of values had been attained.

PHOTOMETRY.—At a meeting of the Academy of Sciences in Washington, as reported by the *Independent*, Prof. Pickering gave a very interesting description of his photometrical instruments, methods, and work at the Observatory of Harvard College. He has certainly taken a long step in advance of any of his predecessors in the same field, whether we consider the accuracy and range of the instruments which he has devised or the number and value of his results. One of his newly constructed instruments enables him to compare accurately the amount of light given by a bright star with that of a little "companion" close to it; and that even if the larger star be not a star at all, but a planet. In the field of the telescope the brighter star is hidden behind a screen, which covers half the field of view, while the little companion is left in sight; and at the same time a much smaller telescope attached to the principal one brings in light from the larger star, forming a little image of it close by the side of the companion. By varying the aperture of the subsidiary telescope, by a simple mechanism, it is easy to make the image of the brighter star exactly like that of the faint companion, and then the ratio of their brightness is determinable, and that with surprising precision—certainly within 1%, even when one is 10,000 times brighter than the other, as is the case with Vega and its little companion.

NATIVE FLOWERS AND FERNS.—"The Native Flowers and Ferns of the United States," by Prof. Meehan, is published by Prang & Co., Boston, the well known chromo-lithographers. The work is to be issued in parts, each one of which contains chromo-lithographs of four plants and 16 pages of descriptive matter. The chromos are the handsomest specimens of floral portraiture we have ever seen. The drawing is botanically correct and the coloring is strikingly natural. The authorship being vested in Prof. Meehan, the distinguished editor of the *Gardener's Monthly*, carries its own surety of excellence far and wide. The first two parts, which we have examined with care, show the "spiderwort" (*Tradescantia virginica*), "three-flowered avens" (*Geum triflorum*), "yellow jessamine" (*Gelsemium sempervirens*), "hoary polypody" (*Polypodium incanum*), common blue violet (*Viola cucullata*), wood anemone (*Anemone nemorosa*), golden columbine (*Aquilegia chrysantha*), and American "thick stamen" (*Psychandra procumbens*). It will be seen by this enumeration that a wide range of our territory has already been called upon for native plants, and we believe the work is one in which the whole country will take pride.

EARTH DEPRESSION IN FRANCE.—A little village in the neighborhood of Draguignan, France, has, says *Nature*, lately been the scene of a remarkable subsidence, which has attracted the curious from all directions. An elliptical tract of ground, containing over 10,000 square feet, sank gradually one day, accompanied by loud noises, until it left an orifice of over 100 feet in depth, with water at the bottom. Numerous trees and vines disappeared completely in the depths of the new lake. A similar depression on a smaller scale occurred in the same vicinity a century ago, and both the phenomena are attributed to the action of subterranean streams.

THE ENTOMOLOGICAL REPORT.—We learn from an Eastern exchange that Prof. Riley, the Government Entomologist recently appointed to the Agricultural Department, has been engaged during the present week on the last pages of his report, as chief of the Entomological Commission under the Hayden Survey. The brief paper upon the subject read by the Professor before the Academy of Sciences, which recently met in Washington, attracted an attention which gives proof of the interest of the forthcoming report.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

THE MINES.—*Ledger*, June 15: A rich strike has been made in the Moore mine, and the erection of a mill has been determined upon. The Lincoln mine continues to pay handsomely, though the last few runs have not yielded so largely as when the extraordinary rich ore was crushed. S. D. R. Stewart has a lease of the mine for three years.

THE MONTEREY.—They had another clean-up here a few days ago, which resulted in a much better yield than the first, showing that the mine is gradually improving as they go down.

ABOUT PLYMOUTH.—The Potosi mine is still being worked, though "tied up." It is a fine property. The old Seaton mine has been "jumped," and workmen are engaged thereon. The Phenix is running with its usual good luck.

CALAVERAS.

SLITER & HOEY.—*Chronicle*, June 15: They have completed their five-stamp cement mill in "Old Woman's" gulch. It will be run with an eighty-foot, overshot hurdy-gurdy, the water having a pressure of 290 feet. The gravel prospects first-rate, and there is every probability that the mine will pay well when the battery is set in motion.

GWIN MINE.—Sinking the shaft here progresses steadily and rapidly. The present sinking is to include 150 feet, instead of 100 as usual, for the reason that the shaft will then be as deep as it will be possible to sink with the present hoisting works. The next level will be the 1550, and when it is completed the mine can boast of 150 feet of "backs," on a pay chute exceeding 300 feet in length, and a ledge from six to nine feet in width. The next level and stopes will probably yield a colossal fortune. A clean-up was lately made in the Emerson hydraulic, Happy valley, after a run of considerable duration. The yield is understood to have been large. Hoisting works are to be put on to the Whisky Slide mine, Jesus Maria district, immediately. A shaft has already been sunk on the mine to a considerable depth, and as soon as the hoisting works are in readiness work will be recommenced with vigor.

EL DORADO.

SOLD TO THE CHINESE.—*Mountain Democrat*, June 15: A Chinese company purchased of Thomas Anderson, L. Landecker, and others, last Monday, a tract of placer mining ground in the vicinity of Cold springs. The sale embraced several claims, all of which had been worked more or less. One conveyance called for a payment of \$4,900, and another for a payment of \$400, making a total of \$5,300.

WORK IN PROGRESS.—The crosscut west from the 220 level at the Placerville company's mine tapped the old works, last week, at the distance of 18 feet. The immense body of water below the head of the tunnel poured into the shaft, filling the drifts and rising 20 feet above the crosscut. Since that time until Thursday last the work of hoisting it out has been going on steadily, and the mine is now free from water except a sump of 15 feet in the bottom of the old works. Explorations made show the timbering in the old incline—with the exception of four sets—to be in perfect condition. Prospecting will now be pushed vigorously above and below, and we hope soon to see a strong force at work on the stopes.

INYO.

LAKE DISTRICT.—*Coso News*, June 15: The Mammoth mine, situated about a mile and a half below Pine City, was recently purchased by Gen. Dodge and other parties of San Francisco. It has large croppings, which have been estimated to be sufficient, should the mine not go down, to keep 20 stamps crushing for 12 months. A tunnel has been commenced, which will have to be run 250 feet, tapping the ledge 300 feet below the surface. Gen. Dodge is expecting a saw-mill to arrive every day. A 20-stamp quartz mill has already been ordered. Work on the mill-race, to bring the water—a mile distant—to the mill site, has been commenced. The Alpha mine, Parker, Lowe & Co., owners, has been bonded to Riley Armstrong, Jim and Dave Lowery, of Gold Hill, Nevada. The tunnel is now in 185 or 190 feet. They expect to strike the ledge every day. There are other locations on the same belt, which are equally as promising, but not having as yet been worked to any extent. In Pine City and Mammoth, two rival towns, there are 75 or 80 cabins, a hotel, 30x80 feet, Saylor & Riddle, proprietors, one general merchandising store and three saloons. Some prospectors have recently made some very rich strikes of base metal mines, 12 miles south from Pine City.

EMIGRANT COMPANY.—Daniel Jones, after examining the property of this company, in Lee district, and consulting with Peter Taylor, the Superintendent, has concluded to move the mill and put in water works. The mill is still running on tailings, but in a few days will close down and make a general clean-up, preparatory to moving same to the mines.

MONO.

THE GENERAL OUTLOOK.—*Standard*, June 11: There has been, during the past week, a very marked improvement in several of our mines,

and the general opinion prevails that Bodie is on the up-grade. A ledge of unbroken ore has been cut in that mine on the 250 level, two and a half feet wide, which it is believed will average over \$100 per ton. This splendid strike is very encouraging, and cannot fail to influence the capitalists who have investments in our mining properties to keep straight down until they strike the bonanzas, which are undoubtedly hidden beneath our rugged hills. The Standard keeps up its regular supply of bullion; the Bechtel is showing a great improvement; there is an unusual stir about the Red Cloud, while they are taking out ore so valuable that they keep it in sacks; they are reported to have made a fine strike in Tioga recently; Black Hawk, McClinton, Belvidere, May Belle, Richer and indeed nearly all our mines are improving amazingly. The Syndicate mill is now working Bechtel ore steadily and will soon be crushing Red Cloud. The Miners' is crushing Black Hawk ore. Mr. Kalmus's new Sherman mill is arriving in pieces from Silver City. A location has been made, the ground purchased and graded and building will be commenced at once. The Sigourney mine, whose very flattering prospects have been published in this paper, has been bonded, and Col. O. R. Johnson has gone below to effect a sale. Bodie may now be considered fairly out on the second heat after a good rubbing down in the paddock, and with a full head of second wind on, she is going to win.

NEVADA.

SNOW POINT.—*Transcript*, June 17: The shaft here is down 115 feet and they are now running a 300-foot surface tunnel to drain the shaft. The tunnel will be completed inside of two weeks, and then sinking the shaft is to be resumed. It is expected that the bedrock will be reached at a depth of 150 feet from the surface. The bottom of the shaft is at present in gravel, which prospects far beyond expectations. Several other important mining enterprises are to be begun before long in that part of the county.

A deep tunnel, to be run by a large stock company, is talked of as the needed thing now for Grass Valley, to open up and drain all that region known as Massachusetts and New York hills, from below Allison ranch. Drained in this way, millions of dollars would be easily taken out by the simplest modes of mining, now out of reach by reason of water.

Work progresses and prospects improve at the Murchie, Pittsburg, Gold Flat, and, in short, nearly all the old standard mines about Nevada City, Grass Valley. Heavy work is being done on the Rocky Bar mine, from which the tributers are taking excellent ore.

RICH QUARTZ.—On Monday last a clean-up of 16 loads of quartz was made at the Allison-Franklin mill, from the claim of Mullen, McDonald & Ford, which yielded \$200 per load. This claim is adjoining the new Rocky Bar ground, and has been noted for the richness of the rock it produces. A number of crushings have been made from this ground, none of which have gone below the above figures and some have considerably exceeded them.

RELIEF HILL.—A correspondent of the San Juan Independent writes concerning this locality as follows: The Walkshaw company has struck a channel of rich dirt in their tunnel. Cleaned up \$3,000 lately. The Eureka company have some splendid ground and will take out coin this season. A company are running a prospect tunnel into the main ridge from the Relief hill-side and have got flattering prospects. The Penrose boys have got a good claim on the river and are making money.

PLACER.

RICH STRIKE.—*Herald*, June 15: A chunk of quartz, containing over 15 ounces gold, was taken from "Pike" Bell's mine, at Bald hill, last week. On Tuesday, \$5,000 were taken from this claim, and on Wednesday, \$2,000 was taken from one pan of dirt.

IOWA HILL.—The Orion mine is being put in good shape for profitable working. A large hydraulic pipe is being laid from Independence hill to the claim, three-fourths of a mile. This improvement, together with the flumes, undercurrents, etc., it is estimated, will cost the company \$12,000. Pipes, flumes and undercurrents will be rigged up for next season's work in the Independence Hill claim.

WASHING THE TAILINGS.—J. H. Neff & Co., having obtained possession of Indian canyon, a most valuable piece of mining property, will shortly give employment to quite a number of hands, blasting the falls, sluicing up, etc. What makes this ground so valuable is the fact that the tailings from a large number of claims leave their deposits here.

THE GIANT GAP.—At this claim, on the divide between Indian and Shirt-Tail canyons, a new pump and new machinery are being put up. During the winter the men were compelled to cease work in the incline, owing to the water. The new pump will obviate this difficulty.

THE EXCELSIOR MINE.—At Forest hill, a strong company, has its shaft down 50 feet, which will be continued a further depth of 400 or 450 feet to the bedrock. The contract for sinking it has been let to A. Steele. The engine and hoisting works for the mine arrived at Auburn Station on Wednesday. The machinery, it is expected, will all be set up in the course of three weeks, when operations will be actively begun. The mine is next the Sacramento claim.

SISKIYOU.

MINING ITEMS.—*Yreka Journal*, June 12: At the Pacific mine on Klamath river, near the

mouth of Humboldt, a dollar to the pan is realized from a hole now being worked under the bed of the stream, and the prospects are favorable for a vast amount of gold being taken out this season. Several of our citizens visit the Lucky Baldwin mining claim, at north side of town, every day lately, to witness the pumping by steam and other operations going on toward getting down on bedrock of the Yreka creek.

TRINITY.

BIG PAY.—*Journal*, June 15: Forty-three tons of ore from the Black Bear mine in Deadwood district, recently crushed in an arastra, yielded \$3,300. This district has yielded largely thus far for the amount of work done, and several of the lodes now being prospected promise to become permanent paying mines.

STILL ANOTHER.—Ritter & Co., on Eastman gulch, a few miles from Deadwood, made another fine clean-up in their arastra the other day. They took out 65 ounces, worth \$16.50 per ounce, aggregating \$1,072.50. This was the result from crushing 15 tons of rock, giving an average of over \$70 to the ton.

MORE GOLD.—Another clean-up was made in the Ward mine on Oregon Gulch mountain this week which resulted in taking out \$5,300. This makes over \$14,000 taken from this mine the present season and some more work will be done before the final clean-up is made. At present they are running about five hours per day.

MINING CLAIMS in Weaver basin have plenty of water yet, but it is not expected to hold out in many of them but a few weeks longer.

TUOLUMNE.

LIVE OAK.—*Independent*, June 15: This quartz mine, near Soulsbyville, on the same ridge with the famed Soulsby vein, was worked some 20 years ago and abandoned. It has now been relocated, under the above name, by W. G. Long & Co., who have retimbered the old shaft—some 40 feet in depth—put in a pump and erected hoisting works, both being run by steam power. They got the water out last Saturday, and from the ledge in the bottom of the shaft, which exhibits a vein three feet in width, knocked off specimens of the rock, which shows a high grade ore. It is heavily charged with very rich sulphurets, showing by assay as high as \$1,000 per ton. The rock assays \$42, and is estimated by competent judges to mill \$25. Some of it shows free gold. It is proposed to sink the shaft 100 feet deeper, and the work is now being pushed ahead. The company will erect a mill as soon as possible. The former owners stope out all the ore, north and south, down to the bottom of the old shaft—40 feet deep—which was drained by a tunnel. Below this they could not go without pumping machinery, which they were too poor to get. For some five or six years after this the location was kept good according to local laws, but was finally abandoned, as the old owners died off or left the county.

Nevada.

WASHOE DISTRICT.

CON. VIRGINIA.—*Gold Hill News*, June 19: Daily yield, 400 tons of ore. There is no change in either the quantity or quality of the ore extracted. But one mill, the California, is being run on the ore taken from the mine. The ore stopes on the 1200 level continue their usual yield of good ore. The western ore body on the 1650 level is opening up well, the ore being of an excellent milling quality. The ore stopes recently opened in crosscuts Nos. 1 and 2 on the 1750 level continue to yield rich ore. The north drift on the 1750 level from No. 2 winze is steadily advancing, the face still in rich ore. The south lateral drift on the 1850 level continues to advance without any material change. No. 3 crosscut on that level is steadily advancing and during the week has cut through a vein of fine ore, eight feet in thickness, which is supposed to correspond with the east ore vein found on the levels above. This ore is of a good milling quality.

CALIFORNIA.—Daily yield, 400 tons of ore. The ore stopes on the 1600 and 1650 levels continue to look well and yield rich ore. The extraction of ore and work on the lower levels is still very materially interfered with by the obstruction of the different currents of air, caused by the platforms used for repairing the Consolidated shaft. Sinking the joint winze below the 1900 level, on the north line, is making fair progress, the bottom being in hard blasting porphyry. On the 1750 level the repairs to the north drift from No. 5 winze are completed, and the drift is now being driven rapidly forward to connect with No. 6 winze. This drift thoroughly opens up the 1750 level, ready for the extraction of ore whenever it is desirable to do so.

OPHI.—At the bottom of the winze below the 1900 level on the ore vein, the west drift, recently started, and the east drift from the 2000 station of the main incline were connected on Friday evening last, greatly benefiting the air circulation in that portion of the mine. The south drift on this level from the winze station has been advanced 22 feet, nearly half the face of the drift having passed out of the ore into the porphyry on the east side of the vein. Fifty feet west of the ore vein at the 2000 station a drift has been started northward in the hard country rock. This drift is designed as the main north lateral drift of the 2000 level, and will be run in the country rock entirely on the west side of the ore vein.

SUTRO TUNNEL.—The face of the header is in easy working vein matter, composed of ledge porphyry, quartz and clay, allowing of a good

rate of advancement. The tunnel having already penetrated the great Comstock belt, and the face of the header being less than 300 feet from the west wall of the lode, it is liable to run into and connect with the workings of the Savage mine very shortly, perhaps before the first of next month.

SUCCOR.—A large air compressor is being built at the foundry, the foundations for the reception of which are already laid, and which will be in place and ready for use in a very short time.

SAVAGE.—The east crosscut on the 1640 level has reached the east clay wall, which has a dip at that point of 43° to the eastward. This drift, before reaching the clay wall, passed through 112 feet of solid quartz and low grade ore. The face of the drift has been stopped on account of the shocks created by the discharge of the blasts in the face of the Suto tunnel being so severe as to shake down rocks and make it very uncomfortable for the men working in the face. The face of the tunnel and this drift lacked only 120 feet, according to the best computations, of a connection one week ago, so that they must be much closer together now, and can probably be connected within a week's time if it is desirable to do so.

CON. IMPERIAL.—The opening up of the 2400 level is being pushed ahead in the most business-like and systematic style. Crosscuts Nos. 1 and 2 west from the lateral drift are in respectively 30 and 15 feet, the face of each being in vein porphyry filled with small streaks of lively quartz, all of which gives low assays of both gold and silver. These two crosscuts have been started for the purpose of testing the ore vein directly under that portion where the rich ore prospects were found on the west side on the 2135 level a year and a half ago, and will yet have some 75 or 80 feet to run to get under that ore body.

ALPHA.—The north lateral drift from the bottom of the joint winze on the 2400 level is now in 150 feet, the face still in a mixture of quartz, porphyry and clay of a soft, favorable character. Taking into consideration the known location of the ore-bearing portion of the vein as developed on the 2135 level, and the natural dip of the vein, it will be necessary to crosscut at least 125 feet to the westward from this drift to reach that portion of the vein where the best ore-bearing portion is expected to be.

JULIA CON.—The east crosscut, No. 1, on the 2000 level is advancing through a mixture of quartz, porphyry and clay of a very favorable character. This drift is now in a distance of 55 feet. East crosscut No. 2, from the main south drift on the same level, is also making good progress, the face in vein matter of a much more favorable make than anything yet developed on the 2000 level.

BULLION.—Sinking the main incline is making the best of progress, the bottom in porphyry mixed with quartz. This shaft is now down 167 feet on the inclination of the ledge, or about 100 feet perpendicularly below the 1840 level. The main north drift on the 2000 level is being pushed vigorously forward, the face in clay and porphyry, streaked with quartz which gives low assays.

BEST & BELCHER.—The south drift on the 1900 level is being pushed energetically ahead, the face having passed out of the heavy vein matter in which it was started into a harder and firmer character of porphyry, making a much better drift and requiring but little timbering.

GOULD & CURRY.—Sinking the main incline is going steadily forward and will be completed down to the 1900 level in a day or two more. As soon as the 1900 station is reached, a pump and tank station will be cut out and the main pumps lowered to that point.

CHOLLAR-COMBINATION SHAFT.—The depth now attained is 2,250 feet perpendicularly. The flow of water is 47,500 gallons daily, all of which is hoisted with the rock in the skeets. The shaft is now about 650 feet below the level of the Suto tunnel, where it passes that point.

CROWN POINT.—The south drift on the 2300 level, running to meet the north drift from the 2360 station of the joint Belcher incline, is steadily advancing at the rate of eight feet per day, the face still in porphyry.

YELLOW JACKET.—The north winze below the 2200 level is down 395 feet on the slope of the ledge; bottom in hard, dry material. This is the only work being done in the mine at present. The new shaft is down 1,520 feet.

BELCHER.—Sinking the main north incline shaft below the 2360 level has been resumed and is making good progress. The south drift on the 2160 level continues in porphyry and clay, carrying streaks of quartz.

SIERRA NEVADA.—The east and west crosscuts on the south line on the 2000 level are each being extended without any material or valuable change to note.

JUSTICE.—The east crosscuts Nos. 1, 2 and 3, from the south drift on the 1100 level have each penetrated the ore vein in part, and show it to be well defined, the quartz of a good quality, carrying many bunches and spots of rich ore. The working force has been reduced to 90 men.

OVERMAN.—The east drift from the 1600 station of main shaft is steadily advancing toward the ledge, the face still in hard, dry porphyry. The station at the bottom of the winze below the 1400 level is nearly completed, ready to start a drift back westward to meet the east drift from the 1600 station of the main shaft.

MEXICAN.—The new north lateral drift on the 1600 level is now in 283 feet, the face in hard blasting porphyry. This drift will connect in

about 10 days more with the old works, and then will form a fine base for crosscutting and prospecting operations to the eastward.

UNION CO.—Retimbering the north connecting drift with the Sierra Nevada mine on the 1600 level is making steady progress, the ventilation showing a steady improvement.

CON. DORADO.—The work of placing the machinery lately purchased from A. Sutro is going on rapidly, and preparations for sinking a three-compartment working shaft are being made. One thousand feet of rope was shipped from San Francisco a few days ago, and when it arrives the sinking of the shaft will begin.

UTAH.—The main south drift on the 1300 level has completed the connection with the Sierra Nevada mine, greatly benefiting the air circulation in that portion of the mine.

HALE & NORCROSS.—The water in the main incline shaft is being gradually lowered, the force of the flow being entirely overcome. Everything in and about the mine is in splendid condition.

CALEDONIA.—The face of the south drift on the 1400 level continues in good working ground carrying quartz with spots of ore. The north drift on the 1600 level is steadily advancing.

ALTA.—Opening the 1250 and 1350 levels and at the same time sinking the main shaft to attain a still greater depth on the ore vein is being pushed ahead with steady vigor.

ELY DISTRICT.

THE MINES.—Pioche *Record*, June 15: Raymond & Ely has made considerable progress during the last week in work relating to air compressor. Ore is coming up pretty rapidly from the upper levels of this mine, and is of good quality. Over 15 tons daily are being hoisted. The road to the Hillside mine and furnace is finished, and the work of hauling ore commenced yesterday. The mine still continues showing up in good condition, and when ready to receive at the furnace, will commence taking out a large quantity of ore. Are now taking out 14 tons daily from the top cut. The sinking of the Day winze is stopped; the other work in the mine is going on as usual. Where the winze was stopped, at the bottom, are drifting in a southeast course, with very good indications, the impression being that the ore lies in that direction. The ore stops 20 feet below the level of the tunnel are improving, the quality of the ore is also getting better.

DRY VALLEY MILL.—This mill is now doing some good work in working the tailings of the company. They are being worked so close that a profit of \$5 per ton over all expenses is made. The mill is turning out about \$16,000 per month in bullion from these tailings, generally about two bars per week. A bar came up yesterday valued at \$1,632.

CHRISTY BULLION.—The Christy Mill & Mining company shipped from Silver Reef, May 31st, one bar valued at \$891.58. This was the last shipment on May account. The total shipments for May amounted to \$25,916.58. The company shipped on the fourth instant one bar, valued at \$1,602.59.

EUREKA DISTRICT.

ABOUT EUREKA.—*Sentinel*, June 20: Wells, Fargo & Co. made the following shipment of bullion for the Richmond company this morning: Eleven fine dore bars, valued at \$22,742.23. This company is receiving shipments of coke from the Southern Colorado coke works, near El Moro, in that State, a distance by rail of 1,500 miles from this point. The new machinery at the Albion mine will be started up today. A large pile of ore is sacked up and attacked at the depot awaiting shipment to Salt Lake. Civil Engineer Robinson is getting up an elaborate map of the Jennie A mining property. The Eureka Con. incline has reached a depth of 100 feet below the 11th level. The double air compressor engine on the 9th level of the Consolidated is of sufficient power to hoist 3,000 pounds from a depth of 2,000 feet. The ore that has been stored at the Metamoras furnace for the past six months has been hauled to the Richmond works for reduction. A large lot of ore is being shipped from Tem Pahute district to Reveille district, the nearest point where there are milling facilities. About 30 men are employed working and prospecting in and around Tem Pahute. The recently discovered ore body in the Geddes & Bertrand possesses two important qualifications. It is an extensive deposit, and carries a handsome percentage of silver and gold. It is also developing splendidly.

Arizona.

SILVER DISTRICT.—*Sentinel*, June 15: This promises to become one of the chief ore-producing localities in Yuma county. This district is situated about 50 miles north of Yuma, on the Arizona side of the Colorado river. It has included in its boundaries that portion of the range of mountains lying between the confluence of the Yuma wash with the Colorado as the southern limit, and lighthouse rock as the northern. The general topographical features of the country do not differ materially from the base metal districts of Inyo county, Cal. The mountains have one marked peculiarity, viz., from a point, considered as the axis of the formation, the range faults from its general trend, bearing to the west, and becomes strictly a slate series; in this section are found the mines of Eureka district. From this point north they become granitic, and here are found the mines of Silver district. Bearing in mind the numerous failures of mining experts to properly estimate the value of mining properties, it would be worse than folly to attempt to do so in re-

gard to this district until it is more fully developed; but this much is assured, every foot in depth so far attained has shown a decided increase in the quality of metal. The veins show a marked degree of regularity, metal is found continuously on their surfaces as far as they are traceable, and the formation is favorable for permanency. The ores are not a clean galena, but associated with them are found carbonates with sesquioxide of iron. Smelting men, however, consider these modifications as benefiting constituents. Wide, open washes run from the river to the immediate vicinity of the mines, a distance of about four miles, affording natural wagon roads for transportation. Feed for animals on the river abundant the entire year.

Colorado.

NEW REDUCTION WORKS.—*Denver Tribune*, June 17: Prof. Hill is pushing the grading for his new and extensive reduction works at Denver, a tract of 80 acres having been secured for the site. The front will be 400 feet in length, and the buildings will run back a distance of 650 feet, covering about six acres of ground. The entire works will be in one enclosure, an immense stone wall eight feet high. The works will also be constructed, it is said, entirely of stone, and will therefore be most substantial and the walla proof against fire. Among the important departments of the works will be the ore-house, which is to be 452 feet long and 119 feet wide, besides an additional 92 by 36 feet for the accommodation of the boilers and engines, and for a sampling room and carpenter and blacksmith shops; the smelting-house, 283 by 64 feet, the repairing-house 286 by 62 feet, the coal-house 204 by 62 feet, and the office. The office will be 77 by 47 feet in size, and will be located about the middle of the front of the building.

Dakota.

MINES ABOUT RAPID.—*Journal*, June 8: The continued rains enable the sluice miners to reap a rich harvest, though they retard mill building and some other branches of business. Prof. Saunders gave it as his opinion that the Mineral Hill cement mines come from the Red Indian lode, which runs through the hill. The new comers—"tenderfeet"—are very successful as placer miners, starting in often and digging for gold where the more experienced would never think of looking for it. Business is lively and there are few unemployed men in Rapid at present. The hotels are well filled and population on the increase. Mining developments are also in rapid progress, this being just now the favorite part of the Hills with capitalists, millmen and others seeking interests in the mines.

Utah.

THE LEEDS MINE.—*Salt Lake Tribune*, June 15: The receipts of this property from November 1st, 1876, to May 1st, 1878, have been \$41,000 from the sale of stock as a working capital, and \$410,189.26 in bullion. The principal disbursements during the same period have been. For mine labor, \$91,000; mill labor, \$43,000; mill supplies, \$58,000; bullion discount and freight, \$52,000, and \$40,276 for the purchase of valuable mining claims adjoining, from which ore is now being taken. The company has distributed \$60,000 in dividends, and carry over a cash balance of about \$6,000. They own three valuable claims, a good ten-stamp mill and are free from debt. At the present market rate the stock is selling at about \$84,000 for the whole property—just one third its value.

THE FRISCO MINES.—The amount of bullion run out last month by the Bonanza company's smelter and the Frisco smelter amounted to 50 car loads, or 500 tons of base bullion, averaging 151 ounces per ton, making a total of \$75,500. Adding thereto \$4,000 run out in silver bars by the Frisco reduction works, it makes the round sum of \$79,500. The Shamtie smelter started up on the 23d of May, and has been running ever since, turning out about six tons of bullion every 24 hours. The smelter is running on raw Rebel ore and thereby saving the expense of calcining. The Albion reduction works have, after several weeks' work, leached out of the Bonanza ores, one silver brick, 800 fine, valued at about \$1,000. The Horn Silver mine, at a depth of 320 feet, is showing a large body of high grade ore, shipping to the smelters and reduction works. The Grampione mine is looking well, and no doubt will prove, after being developed, a second Bonanza. Plenty of men in the district for the work to be done.

MACHINERY FOR AURORA.—George Daly, Superintendent of the Real del Monte mine, Aurora, yesterday started out for his mine four 16-mule teams loaded with portions of the pumping machinery purchased of the Overman mining company. Several more teams will be started out this evening. In all there are 220,000 pounds of machinery to be removed. This will require about 16 teams of 16 mules each. One piece of machinery—the main spur wheel—weighs 24,000 pounds. Being cast solid it must go on one wagon. It is doubtful whether there is a bridge on the road that will support a weight so great. A sinking pump purchased of the Rock Island company, is included among the machinery that is being sent out. It is expected that the machinery will be ready to start up in about 60 days.—*Gold Hill News*.

The Peace Congress will be in session several weeks yet.

News in Brief.

THERE were 91 deaths in San Francisco last week.

THE German Emperor is considered out of all danger.

THERE are 40 pupils in the Art School of Design at present.

THE mobilization of Austrian troops is assuming larger proportions.

FROM reliable data, this year's wheat crop will be 400,000,000 bushels.

GRASSHOPPERS are raiding in Smoky valley, Lander county, Nevada.

LEGAL TENDERS are firm in San Francisco at 99½ buying, and selling at par.

THERE is to be a camp meeting at Calistoga Springs, commencing August 8th.

THE late dry weather has been disastrous to the potato crop around Point Arena.

THUS far about 15 whites have been killed since the Indian outbreak in Idaho.

THE preparations for the Dutch expedition to the North Pole are almost completed.

THE army worm is still operating among the crops in various sections of Inyo county.

THE estate left by George Craut, the English colonist in Kansas, is estimated at \$700,000.

THEY have had several lively earthquake shocks lately at Los Angeles—no damage done.

THE Colorado beetle is said to have appeared in two cantons of the French department of the Vosges.

THE condition of the Russian Empress is improving, and no more bulletins will be published.

A MOVEMENT is on foot in this city to form a colony in the Mexican States of Sinaloa and Sonora.

COL. FRED GRANT has been sent on an extended tour of observation in the Rocky mountains by Gen. Sheridan.

THERE is a heavy tide of immigration, mostly foreigners, flowing into the States and Territories of the far West.

THE late severe storms have killed most of the squirrels that infested the farms in Goose Lake valley, Lassen county.

THE purchasers of the Eureka Con. flue dust calculate that the 6,000 tons contain precious metals to the amount of \$250,000.

A PROJECT is on foot to build a narrow-gauge railroad between Eureka and Beowawe. The cost of the road is estimated at \$600,000.

A CHINAMAN afflicted with leprosy was recently placed by his countrymen on a sand-bar in the Sacramento river and there left to die.

IN New York City, during May, 95 business failures occurred, the liabilities being more than \$5,500,000, and the assets less than \$1,000,000.

JOHN TAYLOR, a young man, was killed at Avery's sawmill, near Emigrant Gap, Placer county, last week, by a heavy log rolling upon him.

THE stallion "Cognac," the man-eater, is now perfectly docile. His broken leg has been splinted and a mold of plaster of Paris placed around in hopes of saving the animal.

BECAUSE of the favorable news from Cuba, the Spanish government has granted an amnesty to all press offenders, and ordered the liberation of the Creoles imprisoned for rebellion.

THE levee on the lower division of Roberts Island has been completed. A considerable portion of the other large islands on the lower Sacramento and San Joaquin rivers is still under water.

THE Irishmen of Pittsburg (Penn.), and vicinity are raising funds to employ counsel for the defense of the five Granuhans and two Haggerty's, whose trial for the murder of Lord Leitrim in the County Donnegal, Ireland, begins at Dublin, July 25th.

AT Coal Creek, Ind., John Kelly, a miner, shot Thomas Mims, a colored miner, in the abdomen, inflicting a mortal wound. He then emptied the remaining loads of his revolver into a squad of colored miners, and wounded two of them. He was arrested.

THE funeral of Rev. C. C. Burleigh, the aged abolitionist, at Florence, Mass., was attended by 1,200 people. Local Unitarian and Congregational ministers took part. Among the speakers was Wm. Lloyd Garrison. Letters were read from Whittier and others.

F. C. FILEY, who was the poet at the Decoration day exercises in this city, died last week in the Home of the Inebriate. Through the influence of the ladies of the Blue Ribbon Brigade, he led an exemplary life for several months, but recently returned to his dissipated habits.

THE New York Socialist labor party have passed resolutions repudiating every endeavor to make that party responsible for any attempted assassination of the Emperor of Germany; condemning the capitalistic press of the country as inimical to culture and progress, and as against the spirit of the republic.

OF 75 meetings of operatives in the Black-hurn region (England), 50 have resolved to go to work at reduction wages, 21 not to resume, and four reached no decision. A large number of operatives throughout Lancashire have resumed work at the full reduction rates of wages, and the great strike is evidently near its end.

IN Gillet, Arizona, on the 12th instant, John Setright shot and instantly killed Sam Weir, without cause, when the citizens immediately lynched Setright. Colonel L. M. Taylor, a prominent citizen, was murdered at the same place and time, supposed to be by the friends of Jack Twillings, a notorious highwayman, who is now in custody. Colonel Taylor was an important witness for the prosecution.

EX-MINISTER WASHBURN is now visiting this State.

EX-VICE-PRESIDENT COLFAX and wife are on a visit to California.

THERE were 190 marriages and 76 births in San Francisco last month.

WIDOW MAGGIE VAN COTT, the Methodist revivalist, has reached San Francisco.

AN immense crop of alfalfa will be cut on the irrigated sage lands of Nevada this year.

CASES of insanity in Oregon have been more frequent in the past three months than ever before.

AT Virginia City, Nev., Cherry, the little daughter of Mr. and Mrs. Coleman, was drowned by falling into a tub of water.

THOMAS McDONALD shot and killed Alexander Nixou, at Bodie, in a drunken brawl. Nixou was President of the Miners' Union.

NINE men who had been found guilty of inciting a rebellion against the government of Chile, were recently shot to death at Valparaiso.

JOHN EDEN, aged 22 years, a native of Scotland, fell from the schooner *Vanderbilt* while heating out of the harbor the other day and was drowned.

CHINESE miners on the west coast of Vancouver's island are supplying liquor to the Indians, and two murders have already resulted in consequence.

AN Indian abducted a girl of seven or eight years old from the house of her sister, in San Benito county, but was pursued by two men and killed.

THE increase to the Mormon population of Utah has been at the rate of 20,000 annually, of which 10,000 were from Europe, and the balance from births, etc.

THE Senate Commerce Committee has reported favorably on Mitchell's bill appropriating \$50,000 for the construction of a first-class light-house on Tillamook Head, Oregon.

COL. JAMES FAIR, who is again suffering severely from rheumatism, has gone to the Steamboat springs in Washoe county, Nevada, to make trials of their curative virtues.

A SON of the late Lieut. George H. Derby, author of "Phoenician," and other humorous writings, and well-known among early residents of the Pacific coast, stands at the head of West Point cadets just graduated.

NUMA DUPERU, JR., 15 years of age, oldest son of Numa Duperu, of this city, while spending the vacation with friends at Noya, Mendocino county, fell from the cliffs while hunting sea fowls' eggs, and was drowned.

TWO privates of Company M, Fourth Artillery, fell off the tugboat *General Canby*, en route from Fort Stevens to Vancouver, on the 13th inst., and were drowned. A private who jumped after them was also drowned.

ON the 17th inst. a report received in Berlin from Vienna of a meditated attempt on the life of the Crown Prince Frederick William caused some sensation, and lead to the arrest of 130 Socialists in the German capital.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

RUBY AND DUNDERBERG CON. M. Co.—June 12th. Capital stock, \$1,265,000. Directors—B. S. Bernard, Robert Cunningham, Fred R. Corton, J. A. Jones and M. L. Stangrove.

BROWN'S BAR DREDGING AND M. Co.—June 13th. Directors—Benjamin Flint, C. A. Swain, S. D. Osborne, A. J. Severance and C. E. Buckingham.

SMITH G. M. Co.—June 13th. Capital stock, \$500,000. Directors—George W. Smith, Robt. M. Fryer, George Lauder, Louis G. Lauder and Silas W. Lauder.

PACIFIC G. M. Co.—June 14th. Capital stock, \$1,000,000. Directors—John F. Miller, C. A. Hooper, Robert Sherwood, Charles T. Bridge and W. E. Sell.

PHYLLXERA IN FRANCE.—According to French correspondence the war against the phylloxera increases rather than diminishes, and plans for combatting the insects abound. The Geneva alleged cure for destroying the devastating bug, where liquified sulphurous acid is employed, costs, with all accessories, about 16,000 fr. per acre! The Paris & Lyons Railway Co. declares it has full confidence in the use of sulphuret of carbon; the injunctious ought to take place at two periods, between December and March, and from the last week in May till the close of June. The company supplies the liquid 25 fr. per cwt. and will take back the barrels and injectors; it also furnishes the chloride of potassium, the tonic for the vines, at the rate of 12 fr. per cwt. This salt ought to be mixed with the ordinary manure, or with earth, and applied round each stem; 24 lbs. of the salt to 50 stocks. It is now established that the winged bug has a winter egg, deposited under the bark, adhering to the latter and never to the wood. Hence, the cure of barking the vines, when not too young. This treatment prevents the products of the aerial eggs from creeping rootwards in July, and does not affect the luxuriant vegetation of the vine. A special glove is employed to rub off the bark. Another enemy of the vine is the snail. This voracious predator is disposed of by powder, ing the leaves and stems in early morning with lime.

THE Rio Vista cannery is putting up from 700 to 1,200 salmon per day.

Continued from Page 388.

especially loss of memory. These symptoms become more intense if they continue to respire in the same atmosphere, and it has been observed that these persons who have once suffered from the effect of this agent conserve a great sensibility to its influence, even without the perception by smell of the presence of this agent, its presence is revealed to them by a peculiar sensation through the whole body, especially in the inferior extremities.

As antidote, solutions of carbonate of soda and of iron salts have been prescribed, but the surest way to guarantee the health of the laborers is to employ perfect hermetically-closed vessels and good ventilation in the factory.

Metallurgy in Benton.

EDITORS PRESS:—There are two mills in this place, the Comanche, 10 stamps, and the Diana, 5 stamps. Both were originally built to work the Aaron process, but, in consequence of a change in the character of the Comanche ore, that mill was afterwards adapted for roasting and panning. The Diana mill has never been changed. Operations here were, however, for a considerable time unsatisfactory, owing to the fact that the gentleman in charge did not understand the process.

In July last year the writer took charge of this mill, and since that time the average yield of the ore has been 95% of the silver contained, frequently reaching 98% when rich ores are worked.

The Value of the Ore in Silver
Ranges from \$60. to \$600 per ton, averaging about \$260. All the ore carries a notable quantity of copper, some of it as much as 40%, which I am sorry to say is wasted for want of facilities for saving it. I have thought of introducing the Hunt, Douglas & Stewart process (with modifications), but circumstances are not propitious at present.

The Fineness of Bullion Obtained
In this mill is from .860 to .980, and could be always up to the latter figure, but for certain reasons of convenience it is found better to get it about .900 fine. The bullion of the Comanche mill from roasted ore worked in pans is from .300 to .600 fine.

The Diana ore consists mainly of the mineral called partzite, the higher grades containing also a good deal of chloride, while the lower are mixed with ironstone.

The Process Employed.
In working these rich ores no "chemicals" are used except salt, as the decomposition of the native chloride by copper furnishes the chemical for the other silver compounds, and as this class of ore always carries an abundance of copper carbonates, iron, in proper quantities, is advantageously substituted for copper balls in the barrels.

Some time ago, being out of copper, I worked the rich ore entirely with iron borings, and the supply of this material being also exhausted, I set some boys to work to gather up empty oyster cans and other old tinware, which answered the purpose so well that I worked ore of \$400 per ton to 98% with them. The loss of quicksilver was for some months about equal to the weight of silver obtained, but I have succeeded in reducing it vastly.

An Element of Mischief.
In working the low grade ores, I found that they contained some substance which neutralized the chemicals to a very great extent, inasmuch that the expense was greater than that of roasting. As I knew that neither carbonate of lead, lime, zinc-blende, nor anything else that I was familiar with in this connection existed to any great extent in the ore, I was a little puzzled to account for the phenomenon, but an analytical investigation revealed the presence of an oxide of manganese mixed with the ironstone, which, by decomposing both the copper chlorides, on the presence of which in the pulp the success of the process depends, caused all the trouble.

Neutralizing It with Sulphurous Acid.
To obviate this difficulty I availed myself of the properties of sulphurous acid, produced cheaply by burning sulphur in a suitable furnace, and, by means of a pump, forcing the fumes into the pulp in a stirring vat, into which the pulverized ore is carried directly from the battery by an elevator and conveyor.

Besides neutralizing the injurious effect of the manganese oxide, the sulphurous acid has the advantage of forming, with the copper carbonate in the ore and salt, the copper dichloride required in the process, while it also seems to act, to some extent, directly on the silver compounds, forming silver chloride. From this preparing vat the pulp is transferred to the amalgamating barrels. As one pound of sulphur costs less than one pound of copper, which is the chemical heretofore used in conjunction with salt, and is chemically equal to eight pounds, the economy is apparent. I obtained a patent for this application of sulphurous acid some years ago. The pump used in forcing the vapor of burning sulphur into the pulp is constructed of wood (except the fastenings), with valves of rubber packing, and is arranged to operate directly upon water, and through the agency of the water, on the fumes.

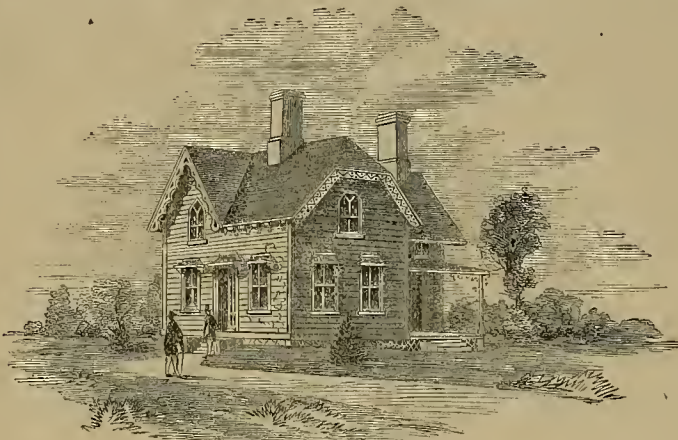
I first attempted to make a strong solution of the acid in water, using the water to form the

pulp, but found that I could not get the water strong enough to work the more refractory ore, because the sulphurous acid made in this way (by burning sulphur) is unavoidably diluted with nitrogen and air, so that it would have been necessary to work under heavy pressure to make a strong solution, which was not convenient; but by injecting the fume into the pulp, where it meets with substances which fix the sulphurous acid, the latter is utilized with little loss.

C. H. AARON.
Benton, Mono County, June 9th, 1878.

A Cosy Cottage Home.

We give on this page a view and floor plans of a cosy cottage, which some of our beginners in the art of home making, or some of our more advanced readers who have small families, may find adapted to their requirements. It is a pretty little dwelling. It looks rather bare in the engraving perhaps, but with a windmill and barn behind it, and with the fore-ground nicely laid out and planted more freely with

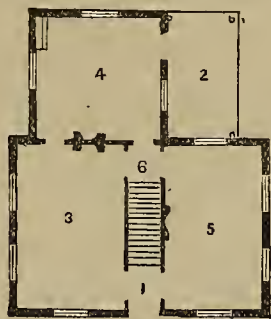


A CHEAP ORNAMENTAL COTTAGE.

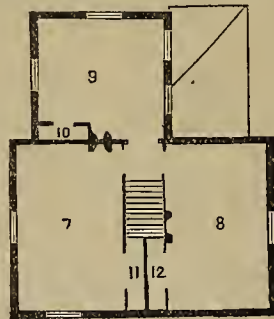
shrubs and flowers, it would soon grow into a little gem of a home. The design is drawn to aid those who have not the money to build large or more ornate dwellings, and it could be erected and finished for about \$1,000. The designers are Messrs. Isaac H. Hobbs & Sons, of Philadelphia, and they offer to furnish full working plans, as may be seen by their advertisement in another column.

The cottage contains three rooms upon the first floor, a parlor, a dining room and a kitchen, and there are three chambers with closets upon the second floor. The roof is so constructed as to admit circulation of air between the rooms. Above the ceiling of the upper floor there is an air chamber with ventilators in each gable. This helps to cool the upper rooms by allowing the passage of air beneath the roof while the hot sunshine is beating down upon it. The cottage is to be built of wood and to have a shingled roof.

The following explanation interprets the



First Floor.



Second Floor.

numbers upon the engravings, and gives the dimensions of the rooms: 1, vestibule, 3½ feet wide by 4½ feet long; 2, parlor 12 by 18 feet in clear; 3, living room, 12 by 18 feet; 4, kitchen, 15 by 18 feet; 5, back porch, 8 feet long by 15 feet wide; 6, a small entry, affording entrance to the living room, parlor, and to the stairway leading to the cellar. The second floor rooms are all private and are entered from the little landing at the head of the stairs. Nos. 7, 8 and 9 are the chambers; 10, 11 and 12 are closets, one to each room.

It will be seen that the little building has no waste room, but gives the inmates the full benefit of all the space. Although it is small the rooms are of good size. The style is unpretentious but it will hold a happy wife and babies and afford a spare room for a nice mother-in-law, and what more does a man need, anyway?

The aggregate number of shares changing hands at the San Francisco Stock Exchange during the month of May, was 1,848,845 shares, of which number Julia scores the highest, viz., 348,113, or the whole mine three times over.

The public debt was reduced during May \$3,070,198.

The Outlook in Montana.

At no time, says the *Independent*, for the past ten years, has the outlook for Montana been so favorable as at present. The abundant rains of the past three weeks assure a good supply of water for placer mining, agriculture and the successful navigation of the Missouri. As a consequence the miners will take out a great deal of money, the farmer will have good crops, and the merchant will be enabled to lay down goods at such low rates that the consumers will purchase at satisfactory prices. The prospects that there will be a good market at fair rates for all the products of the farm in the future were never before so good. The prices of stock of all kinds is steadily on the increase, and this will continue from year to year as our advantages of getting them to market are increased. The range is almost limitless and the business cannot well be overdone. Cattle can be raised here cheaper than in any other country. This seems to be as much the natural home of cattle, sheep and horses as are the great plains the home of the buffalo. The recent developments in prominent mines in all parts of the Territory

are abundant assurance of the permanency and wealth of our quartz mines, and has caused an unusual interest to be manifested in mining enterprises. New discoveries of a valuable character are being made almost daily, and others are being developed and worked with unwonted energy. We cannot now recall to mind a single mine that is energetically and systematically worked that is not paying well or will do so as soon as the proper machinery is put in place for reducing the ore.

The population is increasing somewhat slowly but surely, and those persons who have arrived this season appear to be an industrious and enterprising class, who have come to make this their home, and who have been allured here by the many advantages the country possesses for settlement, and not by wild schemes of speculation and hopes of sudden fortunes without working for it. But while the future is so bright we would again offer words of caution to those who contemplate coming here. There is

Our Telephonic Connection.

Our telephones are in constant and satisfactory operation, and the convenience of being able to communicate instantaneously instead of by means of the tardy feet of the messenger boy is past expression. We have a private line between our patent and publication offices, on Sansome street, corner of Pine, and our editorial and composing rooms, on Clay street. By means of the central system, devised by the American District Telegraph Company, we are able to have private conversation instantly with any one of the hundred or more firms or individuals named in the list below. All that is necessary is for us to call the "Central office" of the District Telegraph Company, at 220 Sansome street, tell them, through the telephone, whom we wish to speak to, and the connection is made at once. Thus each one of the firms named below can communicate with each other, through the joining of the circuits at the Central office. The American District Telegraph is entitled to great praise for devising and putting this system into operation. Already it increases the value of the telephone a hundred fold and there is no reason why it should not a thousand fold, as the list of telephoners increase:

Location of Telephones Tributary to the Central Office System.

*Anderson & Stratton.....Tanners.....	Butchertown
*Anthony, G W & Co.....Brokers.....	102 Kearny
*Anthony, G W & Co.....Brokers.....	240 Kearny
*Abrams & Carroll.....Druggists.....	345 Front
*"Arion Hall".....Henry Grimm.....	Sutter & Kearny
*Bank, Wells, Fargo & Co., Bankers, California & Sansome	
*Bank, French Savings.....Bankers.....	411 Bush
*Board of Education.....General Office.....	Old City Hall
*Board of Education.....Col J A Laven.....	30 Sacramento
*Board of Education.....J W Taylor.....	501 Market
*Baldwin Pharmacy.....H B Slaver, Market and Powell	
*W B Bradbury, Centennial Planning Mills 550-572 Brannan	
*Baker & Hamilton.....Hardware.....	7-19 Front
*Baker & Hamilton.....Hardware.....	2d and Townsend
*Barnes, W H L.....Attorney-at-Law, 426 California	
*Bulger, Martin.....Supt P M S S Co.....	Mail Dock
*Bulger, Martin.....Supt P M S S Co.....	31 Russ
*Blake, Geo M.....Oils.....	123 California
*Blake, Geo M.....Oils.....	1601 Van Ness
*Brandenstein & Co.....Butchers.....	339 Kearny
*Brandenstein & Co.....Butchers.....	Butchertown
*Buckingham & Hecht.....Boots and Shoes.....	523 Market
*Buckingham & Hecht.....Boots and Shoes, Haight & Gough	
*Ball & Julian.....Occidental Wool Dept., Townsend	
*Bernard, Chas.....Coffee and Spice.....	707 Sansome
*Boyson, Dr. Thomas.....Physician.....	112 Kearny
*Crittenden, C S.....Club Stables.....	Taylor Street
*Crittenden, C S.....Dexter Stables.....	221 Bush
*City Hall.....Secretary's Office, Market Street	
*Chief of Police.....City Hall.....	Kearny Street
*Cal Furniture Co.....Furniture.....	222 Bush
*Cal Furniture Co.....Furniture.....	649 Market
*Crocker, H & Co.....Stationery, Sansome & Sacramento	
*Crane & Brigham.....Druggists.....	520 Market
*Christy & Wood.....Wood.....	607 Front
*California Wool Dept., J F Knox.....	Townsend Street
*California Cracker Co., Bakers.....	203 Sacramento
*California Cracker Co., Bakers.....	Battery & Broadway
*Cutting & Co.....Packing & Canning.....	17 Main
*Code, Elbert & Co.....Packing & Canning, 314 Washington	
*Code, Elbert & Co.....Packing & Canning.....	125 Main
*California Paint Co.....Paints.....	329 Market
*California Paint Co.....Paints.....	2nd and Broadway
*Centennial Planning Mills, W B Bradbury.....	550 Brannan
*Cassimer, J....."Fountain," Sutter & Kearny	
*Chy Lung & Co.....Chinese Merchants, 521 Kearny	
*Chy Lung & Co.....Chinese Merchants, 640 Sacramento	
*Club Stables.....Livery.....	Taylor Street
*Coffin, Sanderson & Co.....Brokers.....	312 Pine
*California Elec Works.....Electricians.....	134 Sutter
*Day, Thos.....Gastner.....	122 Sutter
*Dexter Stables.....Livery.....	2nd and Broadway
*Dewey & Co.....Flour Mills.....	202 Davis
*Dewey & Co.....Publishers.....	202 Sansome
*Dewey & Co.....Publishers.....	414 Clay
*Dunphy & Hildreth.....Butchers.....	533 Kearny
*Dunphy & Hildreth.....Butchers.....	Butchertown
*Dry Dock Company.....Dry Docks.....	Hunters Point
*Engine House.....Fire Department, Post & Webster	
*Eureka Warehouse.....A J Gove, Montgomery & Chestnut	
*Elbridge, Oliver.....Prest Dry Dock Co.....	218 California
*"Fountain, The".....Saloon.....	Sutter & Kearny
*Fashion Stables.....Livery.....	Sutter Street
*Field, Stephen D.....Electrician.....	2310 California
*Gallagher, Thos J.....Attorney at Law, 002 Commercial	
*Gilbert & Moore.....Furniture.....	210 Bush
*Gladding, McBean & Co.....Sewer Pipes.....	213 Market
*Gladding, McBean & Co.....Sewer Pipes.....	1312 Market
*Ghirardelli & Danzel.....Coffee & Spice.....	415 Jackson
*Guitard, E & Co.....Coffee & Spice.....	405 Sansome
*Guitard, E & Co.....Coffee & Spice.....	205 Front
*Grangers' Business Ass'n, Produce.....	106 Davis
*Grun & Voglesang.....Saloon.....	215 Third
*Grun & Voglesang.....Saloon.....	142 Fourth
*Grand Opera House.....Theatre.....	Mission Street
*Gamble, James.....W U Telegraph Co.....	300 Pine
*Gove, A J, Eureka Warehouse, Chestnut & Montgomery	
*Hunt, D D.....Druggist.....	5th Solsom
*Howes, E K & Co.....Woodenware.....	122 Front
*Howes, E K & Co.....Woodenware.....	37 Main
*Hochkofler, R.....Merchandise Broker, 205 Front	
*Journal of Commerce.....Publishers.....	414 Clay
*Kiel, F C.....Druggist.....	4th & Market
*Knox, Jno F.....Cal Wool Depot, Townsend St	
*Langley, Chas & Co.....Druggist.....	Front & Pine
*Lepnitz & Co.....Druggist.....	2nd Sutter
*Lieberbaum & Co.....Grocers.....	529 Kearny
*Lieberbaum & Co.....Grocers.....	1303 Polk
*Lane, Dr L C.....Physician.....	052 Mission
*Ladd, Geo S.....Prest G & S T Co, 222 Sansome	
*Ladd, Geo S.....Prest G & S T Co, 515 Van Ness	
*Macdonald & Co.....Coin Merchant.....	204 Sansome
*McDonald & Malone.....Fashion Stables.....	10 Sutter
*McKinlay, Jas.....Pacific Commercial Co.....	228 Sae
*Mining & Scientific Press.....Dewey & Co.....	202 Sansome
*McCall, J G.....Railway Agent, 15 N Mont'g	
*McCall, J G.....Railway Agent, 614 Washington	
*Murphy, Horn & Byrne.....Butchers.....	533 Kearny
*Murphy, Horn & Byrne.....Butchers.....	Butchertown
*McMenomy, J H.....Butcher.....	Cal Market
*Michelsen, Brown & Co.....Butchers.....	308 Front
*Michelsen, Brown & Co.....Butchers.....	Butchertown
*Miller & Lux.....Butchers.....	533 Kearny
*Miller & Lux.....Butchers.....	Butchertown
*Mayhew, Earnest & Co.....Grain.....	302 Davis
*Mills, D O.....Capitalist.....	London & S F Bk
*McDonald, M J.....Broker.....	215 Sansome
*McDonald, M J.....Broker.....	1096 Post
*Mahe, Gustave.....Banker.....	411 Bush
*Maxwell, Dr R T.....Physician.....	335 Kearny
*Newton Bros & Co.....Grocers.....	204 California
*Newman, Carlton.....Prop Glass Works, 1555 Folsom	
*Oriental Bond & Warehouse, Pool & Barris, Bryant & First	
*Odd Fellows Association, 1 O O F Bu'lg, 325 Montgomery	
*Odd Fellows Cemetery.....Cemetery.....	
*Palace Stables.....Hacks & Coaches.....	015 Howard
*Police Office.....Chief of Police.....	City Hall
*Post Office.....Washington & Battery	
*Post Office.....Station C.....	Mission & 20th
*Pohel, J.....Tailor.....	202 Montgomery
*Pohel, J.....Tailor.....	103 Third

BLACK VARNISH FOR COPPER OR WOOD.—In a large-mouthed bottle W. M. Ayres puts 500 grammes of methylated alcohol, and 90 to 100 grammes of pulverized gum lac. In another similar bottle he dissolves 90 to 100 grammes of powdered bitumen in 500 grammes of benzine. Shaking the bottles frequently, the solution is complete at the end of two or three days. The two solutions are mixed in equal proportions, and thickened to the consistency of cream with finely pulverized charcoal.

* Pacific Commercial Co.	Coal	29 Sacramento
* Pacific Commercial Co.	Coal	Geary & Mason
* Pacific Commercial Co.	Coal	Sutter & Larkin
* Pacific M S Co.	Transportation	Mail Dock
* Painter, Emil	Druggist	Clay & Kearny
* Painter, Emil	Druggist	11th & Mission
* Poly, Heilbron & Co.	Butchers	339 Kearny
* Poly, Heilbron & Co.	Butchers	Butchertown
* Pool & Harris	Orinental Wareh'	1st & Bryant
* Quong Lee	Chinese Merchant	825 Dupont
* Quong Lee	Chinese Merch'	405 Merchant
* Quong Lee	Chinese Merchant	410 Kearny
* Redington & Co.	Druggist	529 Market
* Richards, C F & Co.	Druggist	Clay & Sansone
* S F & Pacific Glass Wks.	C. Newman	King
* Sace, L F.	Warehouse	Battery & Union
* Slaven, H B.	Druggist	Market & Powell
* Selig, M.	Butcher	331 Kearny
* Selig, M.	Butcher	Butchertown
* Stalford, Dr J H.	Physician	37 Post
* Stahlin, Jno I.	Suit G & S T Co.	1812 Pierce
* Starn, Victor H.	S Cassiner & Co.	25th & San Jose Ave
* Taylor, John & Co.	Druggist	Glassware, 512 Washington
* Taylor, Jno W.	Gutta Percha	501 Market
* Tevis, Lloyd	Capitalist	Bank of W F & Co
* Trumppour, J P.	Dentist	2021 Mission
* Trumppour, J P.	Dentist	4014 Hayes
* Tay, Geo H & Co.	Stores & Tinware	614 Battery
* Underwriters' Fire Patrol	Ecker & Stevenson	
* United Carriage Co.	Hacks & Copes	Palace Hotel
* United Carriage Co.	Hacks	Sutter & Leavenworth
* United Workmen	Boot & Shoe Co.	416 Market
* United Workmen	Boot & Shoe Co.	25th & Bartlett
* Verdinal, D F.	Mining Secretary	327 Pine
* Verdinal, D F.	Mining Secretary	1525 Sutter
* Verneil & Wellington	Hay & Grain	608 Fourth
* Verneil & Wellington	Hay & Grain	4th & Berry
* Western Union Tel Co.	Pine & Montgomery	
* White, Capt Russell	Fire Patrol	Stevens St
* White, Capt Russell	Fire Patrol	323 Howard
* West Coast Furniture Co.	Furniture	4th & Bryant
* Wingate, J C.	Oakland Express	Sacramento
* Williams, Blanchard & Co.	Agents P M S S Co.	218 Cal
* Wellman, Peck & Co.	Grocers	416 Front
* Whitney & Webster	Wool Warehouse	King
* Waldstein, A.	Lithographer	Sac & Sansone
* Waldstein, A.	Lithographer	King near 3d
* Wangenheim & Co.	Packing & Canning	120 Bay
* Wells, Fargo & Co Bank	Bankers	Cal & Sansone
* Willard, G H.	Brokers	Safe Deposit Building
* Wilson, J Y & Co.	Provision Packers	503 Market

*Names preceded by stars are connected with the Central Office, and can be switched into private connection with each other.

Mosaic Gold.

The so-called mosaic gold consists of sulphuret of tin— Sn_2S_2 , and forms fine scales of a gold yellow color, which can be sublimated at a moderate temperature without being decomposed, and which possesses a high degree of resistance to the influence of chemical agents. It has a peculiar fatty consistence, and is easily transferred to paper, etc. On account of this quality it is often used for bronzing frames, and as a gold color for printers' work. Mosaic gold can be made either by the dry or wet process. By the latter method a solution of chloride of tin is treated with sulphureted hydrogen gas, when a yellow precipitate of sulphuret of tin is obtained, but which is not remarkable for its fine color. The mosaic gold which is obtained by the dry process is far more beautiful. A great many regard this method as a very difficult one, but it is really exceedingly simple. The great art which must be observed in the preparation of this color is not to exceed a certain temperature, as otherwise a great proportion of the compound sulphuret of tin will be again decomposed by giving out sulphur into simple sulphuret of tin. To prevent the temperature rising over a certain degree, sal-ammoniac is used which body is evaporated at a certain temperature—any heat which is afterwards used is for the purpose of evaporating the salts. A little care is all that is necessary to interrupt the heating before all the sal-ammoniac is volatilized, and thus obtain a beautiful mosaic gold of a really gold-shining color. If too much heat is used a simple sulphuret of tin is formed, which has a gray tint, and this, of course, considerably detracts from the ground tint of the gold. Metallic quicksilver, or compounds of quicksilver, can be employed instead of sal-ammoniac, which also evaporate at a temperature below that which affects mosaic gold. The heating of quicksilver, or its compounds, must be carried on in glass retorts, on account of the poisonous nature of the mineral, and its costliness, as by this method the quicksilver can be recovered. This heating in glass vessels, however, requires great care, as their explosion might cause serious injuries. The quicksilver gives the most beautiful product, however, and is used where it is required to have a color which most nearly approaches that of gold. To avoid the dangers and losses which are inseparable from the use of glass vessels, an iron vessel is recommended. It must contain but one kettle, and have a broad rim, on which a cover in the form of the neck of a retort can be placed. By means of pipes this retort can be placed in communication with another room, in which the substances which have not cooled in the neck of the retort can be condensed. There are a great many recipes for the production of mosaic gold. We give some of the best ones, which have always given a good result: Tinfoil, 40 parts; sulphur, 35 parts; sal-ammoniac, 25 parts. The finest tinfoil procurable is put into a mortar with the sulphur and ammoniac, which must have been thoroughly mixed, and then subjected to a slow heat. As soon as the formation of vapors has ceased more heat is applied, but gradually, until a dark red glow is attained. The mosaic gold will then be found as a beautiful yellow mass, for the most part in the bottom of the sublimatory vessel, but partly also, as scale-like crystals on the sides of the vessel and the covering. Other recipes are: Zinc putty, 80 parts; sulphur, 60 parts; ammoniac, 30 parts. Or: Tinfoil, 45 parts; sulphur, 35 parts; ammoniac, 25 parts. —Translated for the *Jeweler from Handbuch für Farben-Fabrication.*

USEFUL INFORMATION.

Coking Bituminous Coal.

We have received a communication from Levi Stevens, of Joliet, (Illinois), concerning the coking ovens which he has patented, and which he believes will enable us to turn our bituminous coal into a coke which can be used to great advantage in making iron and for the reduction of other ores on this coast. The subject is certainly one of interest for what it claims, and we print the following points from Mr. Stevens on the subject: "The great difficulty in coking Western coal is the sulphur it contains. What- ever can be accomplished in coking it, the coke would be worthless if it contained too much sulphur. All Western coal has a large amount of sulphur in various combinations, at least three per cent. In coking, about one-half is carried off. The coal also loses about one-half of its weight; consequently a coke made from any coal will contain about the same percentage of sulphur as the coal from which it was made. A coke carrying 3% of sulphur would be of no value for smelting purposes. To get rid of the sulphur, before coking, expensive machinery has been employed to grind and wash the coal; by this means the sulphur, in combination with iron (pyrites), was taken out. This, however, disposes of but a small percentage. The larger percentage of the sulphur is not associated with iron, but with the lime and carbon in the coal, in such a condition that it cannot be separated by mechanical action. Another difficulty in making good coke from Western coal is, that while they are rich in bitumen, or hydrocarbon, they are hard and require a high heat to reduce them to a homogeneous condition. Before this can be accomplished the heat has expelled all the bitumen or hydrocarbon, leaving a spongy, friable mass, without the elements necessary to solidify it. By my process of coking this difficulty is overcome. The volatile hydrocarbons that are expelled in heating are returned to the coke from the same amount of coal in adjoining ovens, when it is in a condition to receive its bitumen and settle into a homogeneous mass. To get rid of the sulphur after the process of coking is completed, and before the coke is discharged from the oven, while the mass is at a high temperature I inject steam, heated to about 1,000° Fahr., at the bottom of the oven into the center of the coke, with sufficient force to permeate the entire mass of coke in the oven; under these conditions the steam is instantly decomposed without reducing the heat of the coke; the oxygen thus liberated takes up the sulphur and carries it off as sulphurous acid. These processes have been fully tested on several Illinois coals. If they had not, I believe they would commend themselves to scientific and practical men as sufficient to overcome the difficulties in coking Western coal. Wherever bituminous coal is found, coke can be made."

Manufacture of Lamp-Black from Natural Gas.

According to the report of the judges of group III, at the late Centennial Exposition, the manufacture of lamp black from natural gas is a prosperous industry in Ohio. As we have found natural gas wells in this State, possibly the information may be of practical value to us some day. The *Polytechnic Review* gives a summary of the report to which we have alluded. From this authority it appears that fine lamp-black has, for the past two years, been made at Gambier, Ohio, by the imperfect combustion of the natural gas. Two wells, yielding an abundance of gas, but no mineral oil, occur in Knox county, Ohio, near the junction of the Kokosing and Mohican rivers, which Mr. Peter Neff, of Gambier, has utilized in the extensive production of lamp-black, to which he gives the trade name of "diamond black." For the production of this black, the manufacturer has devised and patented several methods of burning the gas by a species of imperfect or smothered combustion. The simplest of these is an inverted burner, terminating in a hood or dome opening downward. The burner tube supplying the gas is brought down flush with the lower edge of the dome, and the gas, flowing downward out of the tube, imperfectly consumes and escapes uniformly about the edge, the separated carbon depositing itself on the nuder surface of the dome. Other devices for this purpose are in use, but could not be well understood without the aid of an engraving.

We are told that in the building of Mr. Neff there are 1,800 burners at work, consuming about 275,000 cubic feet of gas per 24 hours, which is about one-fourth of the available supply, the yearly product being about 16 tons of lamp-black.

The product is described as being very fine and smooth, free from any coarse and gritty particles and of an intense blue-black color. The absence of oily matter is shown by the fact that it readily mixes with water, in which particular it contrasts strongly with common lamp-black. It does not color either, and the liquid, when evaporated, leaves but a trace of residuum, while ordinary lamp-black, presumably from resin, gives a deep yellow solution, leaving, on evaporation, an orange-brown tar. By burning a quantity of the diamond black, scarcely an appreciable quantity of ash is left behind, and this little is probably derived from the scraping of the metal surface of the hoods.

Telephonic.

In a note to the French Academy, M. Brequet says that all the points of the telephone—the handle, the binding screws, the shell, etc., as well as the plate, may enable one to hear sounds. He demonstrates this with the string telephone. Attaching the string to any point of the Bell telephone, and using the parchment membrane, one may easily correspond with a person using a Bell telephone. Thus, by attaching several string telephones to a Bell telephone, several persons may hear the messages simultaneously. To render string telephones more practically useful, M. Brequet fixes to the center of the membrane two or several strings meeting there at an angle. The sound carried by one of them is propagated by all the others. A thread is also passed through the centers of membranes, which then serve as supports for long, straight lines. A sort of relay is also formed by means of a brass cylinder with two membranes, to which strings are connected. This method of extending the string telephone has been in use in this country for the past three years.

M. A. Demogot, of Nantes, estimates that only about 1-1800 of the sound which is communicated to the telephone is transmitted to the receiver. He considers that the muscular effort of the speaker is transformed: 1, into vibrations of the air; 2, into metallic vibrations; 3, into magnetic waves; 4, into electric induction; 5, into magnetic induction; 6, into metallic vibrations; 7, into vibrations of the air; 8, into vibrations of the auditory apparatus. If we suppose the loss of useful effect at each transformation to be equal, the loss would be comprised between two-thirds and one-half. This represents, very nearly, the experimental efficiency of pumps.

MAKING PAPER TRANSPARENT.—Artists, designers, decorators, architects, land surveyors, and all who have occasion to make use of tracing-paper, in their professional duties will be glad to know that any paper capable of the transfer of a drawing in ordinary ink-pencil, or water-colors, and that even a stout drawing-paper, can be made transparent as the thin yellowish paper at present used for tracing purposes. The liquid used is benzine. If the paper be damped with pure and fresh distilled benzine, it at once assumes a transparency, and permits of the tracing being made, and of ink or water-colors being used on its surface without any "running." The paper resumes its capacity as the benzine evaporates, and if the drawing is not then completed, the requisite portion of the paper must again be damped with the benzine.

A GREAT EXHIBITION IN 1879.—England has decided to have a great show next year. It will be an agricultural exhibition. The expense is estimated at \$150,000. The Lord Mayor of London has appealed to the British public for the support of the projected enterprise. It is to be under the auspices of the Royal Agricultural Society. Agriculture is declining in Great Britain, and there is some hope that the exhibition may arrest its downward course. The number of cattle and the acreage of wheat and other crops are decreasing, and very nearly one-half the population of the United Kingdom is now dependent for sustenance upon imported food.

ESSENCE FOR FUMIGATION.—Mr. H. W. Langbeck, in the *London Pharmaceutical Journal*, gives a formula for an essence suitable for saturating paper for fumigations: Oil of cloves, cinnamon, cedar, lavender and mace, of each half a drachm; oil bergamot, one drachm; balsam peru, essence of musk, of each half an ounce; tincture of tolu, 12 drachms; benzoin, three drachms; rectified spirits, 10 ounces. Dissolve and filter.

BISMUTH BRONZE.—A bronze which withstands oxidation and which is particularly suitable for the preparation of metal and lamp reflectors is made of the following: Copper, 52 parts; nickel, 30; zinc, 12; lead, 5, and bismuth, 1 part.

GOOD HEALTH.

Effect of Sea-Water in the Ears.

As it is the season for sea-bathing and the surf at the favorite resorts is full of swimmers, it is timely to talk of a possible ill effect of the salt water. If you don't wish to run the risk of becoming deaf, take a handful of cotton along with you, and when you go in bathing, put plugs of cotton in your ears. This may save you from earache and perhaps from more serious trouble. Dr. Samuel Sexton, surgeon-in-chief to the New York Ear Dispensary, in a recent communication to the *Medical Record*, estimates that a thousand people of New York city are sent to their physicians, to be treated for ear diseases, every year, whose trouble has arisen from getting water in their ears while bathing or from catching cold at such times by exposure or neglect.

It appears from the doctor's researches that salt water is peculiarly irritating to the delicate structures of the inner ear. Very cold water of

the freshest kind may, however, be equally harmful, and there is a short list of cases resulting from the Russian bath, two of the patients being themselves physicians. A few instances are cited where the trouble came from using the so-called "nasal douche," water having penetrated to the ear by the passage from the back of the mouth. But these are unimportant compared with those where trouble has come from salt-water bathing. In all of 65 of the last named cases inflammation occurred; in 57 it was acute. A variety of subsequent damages may accrue when the trouble spreads; permanent deafness is not among the least of these and life itself may be endangered.

Surf bathers are especially exposed to such injuries, since a breaker may strike them on the side of the head and drive the water into the ear; the same result may ensue if the bather gets a sudden mouthful from an unexpected wave, the water then being forced through from the mouth to the inner ear. Man, the doctor thinks, is not naturally amphibious. Animals fitted for aquatic life are provided with various arrangements for keeping the water out; seals, for instance, have a movable membrane in the ear, which closes and shuts out fluid. The muscles of the water-shrew are competent to shut the ear-passages. People who are blessed with very small openings of their ears run the least risk in bathing. A man should never dive, says the doctor, if he wishes to preserve his hearing. When in the surf, he should take the wave on his chest or back, "closing his mouth and nostrils;" though how a man can close his nostrils, the doctor does not state. But the pledget of cotton for the ears is essential and every bather should be provided with it.

Temperature and Light in Sickrooms.

William J. Larmer writes to the *Herald of Health* concerning the care of sickrooms. We quote a few paragraphs: In order to keep the various impurities from accumulating in dangerous quantity, each person in a room should be supplied with 3,000 cubic feet of air per hour; and this should be done, where possible, without creating a perceptible draft, for the nervous irritation induced by drafts is liable to produce internal inflammations.

The temperature of the sickroom should be kept at a uniform height, the best average being from 65° to 70° F., except for infants or very old people, who require a temperature from 75° to 80° F.; and for these it is especially important to guard against changes, and keep it as uniform as possible. All cases of fever require a temperature lower than the average, as from 50° to 60° F., to assist in reducing the high temperature of the body; but when the fever subsides, and there is much debility remaining, the temperature should be raised somewhat above the average. As a patient can hear a greater degree of cold when in bed than when out of it, convalescents from severe diseases, fevers especially, should have the temperature of their rooms higher than that maintained during the height of the attack. Diseases of the air passages, as croup and diphtheria, require a high temperature (80° to 85° F.) and a moist atmosphere. The best method for heating the sickroom is by the open grate fire.

The sickroom should not be darkened by blinds, except where there is disease of the eyes, with photophobia, or when the patient is very restless and cannot sleep, then strong light must be excluded. Otherwise the sunlight should be allowed to enter and act chemically by decomposing the noxious gases, and thus purify the air. Of course it is not advisable to place the patient under a strong, uncomfortable glare of sunlight, nor in summer to allow the sun's rays to shine into the room and raise the temperature too high. Artificial light has no useful effect, but does harm by burning up oxygen.

POISONOUS TOILET POWDER.—The *London Lancet* says that for some time past there has been an epidemic among young children in the neighborhood of Loudon, ending in many cases in the death of the child, and the disease presenting every appearance of erysipelas. A person whose child was thus attacked, suspected the violet powder in use in the nursery, and sent a packet to a firm of analysts for chemical examination. It was found to contain 25% of white arsenic. This poison, it seems, is unfortunately exceedingly cheap—at all events, cheaper than starch, of which violet powder is usually made. That the case was not an isolated one is proved by the fact that the analysts subsequently purchased several packets of powder themselves, and on analysis discovered the same poison in the same amount. Their analysis have, moreover, been confirmed by the medical men in the neighborhood.

THE HEART-BEATS OF A LIFETIME.—According to a French medical journal, Dr. Guyot, consulting the best authorities on the subject, and making the necessary calculations, has determined that the number of pulsations during the different ages of life are as follows: During the first year, 63 millions (in round numbers); during the first two years, 120 millions; during the first eight years, 435 millions; during the first 12 years, 614 millions; during the first 14 years, 698 millions; during the first 36 years (giving the figures in full), 1,229,904,900; during a life of 50 years, 1,928,160,000; during a life of 60 years, 2,269,800,000, and during a life of 80 years, 3,007,040,000.

MINING SCIENTIFIC PRESS

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The Week.

The election held on Wednesday last to choose delegates to the Convention for revising the Constitution of the State appears to have been attended with a mixed result, a portion of the candidates of each of the several parties in the field having been elected. At present writing the details of results are no known.

The ingathering of a large hullion harvest and the good promise of the cereal crops are beginning to strengthen confidence in the future and to tell favorably on most kinds of business. Already trade and certain of our mechanic and manufacturing industries have experienced some improvement, and the reasonable hope is entertained that prices have touched their minimum, especially as regards public securities and real estate. Meantime, a protracted period of adversity has forced upon our people habits of greater industry and economy, the beneficial effects of which may be expected to last for a long time. The Indian outbreak in Idaho, though likely to prove more formidable than was at first supposed, there is reason to believe will soon be suppressed in view of the energetic measures being adopted to that end. A good deal of railroad construction is in progress in different parts of the State, consequent on the large amount of grain requiring to be moved this season. The damage to the reclaimed islands in the tule land districts proves to have been more serious than was anticipated, the most of them being again submerged by the high stages of water incident to the melting of the snow in the Sierra Nevada. Further attempts at their restoration will be abandoned for the present.

There were 1,900 passenger arrivals at San Francisco by sea last month, including 1,693 from China, and 912 departures, of which 254 went to China. For the same month last year the arrivals were 3,029, including 2,222 from China, against 1,270 departures, of which 449 went to China.

Going to Sonora.

As an effort is now being made in this city to form a colony for settlement in the State of Sonora, Mexico, it becomes the duty of the newspaper press to furnish the parties who contemplate emigrating to that country such reliable information as they may possess in regard to its natural resources and the inducement it may offer for settlement by the people of California. The proposed colony intend, it is said, to engage in agricultural, stock raising and similar pursuits. If so, the opportunities for carrying on either of these branches of industry, everything being kept in view, are by no means as good as in California, Oregon, Washington or almost any of our other Pacific States or Territories. Sonora, like California, has its wet and its dry season, but the average rainfall is much less there than in this State, the country being subject to extreme and long-continued drouths, some of which hold for two entire years in succession. No grain can be raised without careful irrigation, and water is everywhere scarce, especially so in the agricultural districts. When raised there is no market for grain or other farm produce at prices that an American would consider remunerative. This part of Mexico has been in the possession of the Spanish race for several centuries, wherefore all the arable land eligibly situated has been taken up and reduced to private ownership, the practice of granting to individuals large tracts of the public domain having prevailed there as in all other Spanish-American countries. The owners of this land appreciate it at its full value, and do not as a general thing care to part with it, being especially averse to selling it to Americans. It is doubtful whether good plow lands could be bought in the settled portions of Sonora as cheaply as the great agricultural valleys of California, and there is in that country no public land open for location as in this State. The climate of northwestern Mexico is not only dry, but except in the higher mountains, is hot and debilitating beyond anything experienced in northern or central California, foreigners who go there to live soon losing their energy and falling into the listless, shiftless habits of the native inhabitants. For raising cattle and sheep the country is better adapted than for farming, though inferior in this respect, ready market being kept in view, than regions further north.

For mining purposes this portion of Mexico offers better inducements; yet no one should go there to engage in this branch of business without a certain amount of capital. The vein mines of Sonora are, beyond any question, extensive and rich, the vast amount of bullion taken from them in times past furnishing ample affirmative testimony on that point. But the better class of mines like the choice farming land have become private property, and they too have been worked for centuries, the more available and tractable ores having in many instances been exhausted. The early miners worked great numbers of these lodes down to the line of permanent water, after which, being unable to drain them, they were abandoned. Subsequently the shafts and tunnels then excavated caved in, so that parties now starting in to work these lodes would be obliged to open them anew, requiring machinery for hoisting and pumping almost from the first. To transport machinery and supplies from the Gulf to the mines is a tedious and costly business, as the distance is considerable, and the carriage has in part to be made on the backs of animals. There is now lying along the mountain trails of Sonora much machinery packed in years ago but which never reached its destination, and of all the California companies who have attempted to operate them scarcely one has ever made a marked and permanent success.

There are placers in that country, but they too have been pretty well depleted of their surface wealth and can no longer be worked with profit unless water be brought upon them. In most cases there is little or no water to be had, and where it does exist it can be introduced upon the mines only through ditches to be constructed at considerable cost. It will be seen then, that there is little use of parties going to this section of Mexico with the intention of engaging in mining unless they have money or are in a position to command capital, as it may be required after they get there.

KNIGHT'S WATER WHEEL.—In our advertising columns will be found a card giving the localities where the Knight water wheel is at work at various places in this State, and the duty it is performing. The wheel has now been so long at work that it is no experiment, and the success it has accomplished is evinced by the number of places where it is used. It is claimed that a very high percentage of the power is utilized by this wheel, and its simplicity of construction will commend it to any practical man. One of our correspondents, who has seen the wheel in operation in many localities in Amador county, writes that it gives universal satisfaction.

CINNABAR, containing a high percentage of quicksilver, has been met with in the San Francisco sulphur company's mines at Rabbit Hole, Nevada, and the prospects are favorable for extensive deposits of the ore being found there.

The late Prof. Henry made 22 inventions, not one of which he patented.

A Feat in Photography.

Photographing a Horse while Trotting Forty Feet a Second.

We had the pleasure of witnessing on Saturday last the successful accomplishment of a feat in photography which has never been excelled, and which marks an era in the art, viz., taking a series of photographs of a trotting horse while at full speed, so as to illustrate the stride. A series of experiments with this end in view have been made by Muybridge, the photographer, at the instance of Gov. Leland Stanford, and the trial on Saturday showed how perfectly the work could be done. The experiments have been conducted at El Palo Alto farm, Menlo Park, where Gov. Stanford has established a stock farm for breeding thoroughbred horses, and where there is a fine track over which the horses could be sped.

Some five years ago Gov. Stanford asked Muybridge if it were possible to take a photograph of a trotting horse at full speed, but at that time it was considered impossible. About a year since, however, the experiment was tried and a photograph of "Occident" was taken while the horse was traveling 36 feet per second. It was a single picture, however, and excited more ridicule than praise, as most people thought the whole thing a humbug, not believing it possible for the picture to be taken, and not believing the position of the horse to be natural. This initiatory attempt has been followed up, however, until on Saturday last a series of 12 pictures were taken in less than half a second, while the horse was traveling 40 feet per second. These pictures illustrate the stride of the trotter precisely, and although they upset many preconceived theories and opinions, may be regarded as decisive. The method of taking the pictures is by no means complicated, and when once understood will be seen to be perfect, but several different ways were tried before a successful one was found.

On one side of the track a large screen is placed, and set at an angle of about 20 degrees from the perpendicular, the screen being covered with white cloth and having vertical lines formed across it 21 inches apart, which show black against the white cloth. The spaces between these lines are numbered from one to twenty in conspicuous black figures at the top. At the bottom is another low white screen with horizontal lines four inches apart, to show the height of the horses feet above the ground. Powdered lime was sifted over the track in front of the screen so as to make a perfectly smooth white surface, over which the horse was driven. On the opposite side of the track from the screen a low shed was erected, open in front, and on a bench or table were placed 12 cameras, numbered in order, so as to take 12 views 21 inches apart. These cameras were of English manufacture and constructed with an improved double slide, so that the exposure could be cut off instantly, one slide moving each way across the lens. The slides were held open by a catch connected with an armature in the side of the camera. A battery of eight jars was placed in the shed and each camera had an independent set of wires. These wires were led across the track under the ground until within two feet of the background or screen, where they were raised so that one of the sulky wheels would pass over and strike them. The wires corresponded with the vertical lines on the background, and as the sulky wheel passed over the wires the armature holding the catch of each separate instrument released the catch and the slides cut off the exposure of the camera at the instant, so that the photograph was taken without any blur. As the wheel passed over the different wires the different pictures were taken, each 21 inches apart, illustrating perfectly the stride of the horse.

The trotter "Abe Edgington" was brought out on Saturday, and after being warmed up a little over the track, after the apparatus was all ready, he was put to a 2:20 speed past the screen. He came down the track in splendid style, with a good, square motion and firm trot. As soon as the wheel struck wire No. 1, camera No. 1 was closed by the means described, and the first picture taken; when it struck No. 2 the second camera had the second picture, and so on until 12 pictures were taken 21 inches apart. The arrangement insured accuracy which was unquestioned. The horse was traveling about 40 feet per second and there were 12 distinct and separate pictures taken in a space of 21 feet, each in an inappreciable part of a second. The sound of the slides closing was like a continuous roll, so quickly was the feat accomplished. The negatives were perfect, without any signs of blur or indistinctness.

It would be impossible to describe the various positions of the horse's feet at different points of the stride, but there are positions which one would scarcely imagine, but which could not be questioned by those who witnessed the operation. At one point all four feet are off the ground, the two nearest being eight inches above it. Some of the positions are very curious, indeed, but one needs to see the photographs to appreciate them. Muybridge intends to mount the whole 12 on one card on a small scale, so that any one can procure them at Morse's gallery.

In photographing a running horse the wires could not be used in the same way for manifest reasons. Fine black threads were placed across

the track, 21 inches apart, and connected so that the armatures would release the slides as before. The racing mare "Sallie Gardner," a handsome animal, was brought out and the threads placed so as to strike her breast as she went by. The instruments were made ready, the signal given, and she came rushing down the track like a whirlwind. As the threads successively, by the means described, released the catches and closed the slides, the 12 pictures of the running horse were taken. When the mare broke the eighth or ninth thread she became aware of something across her breast, and gave a wild bound in the air, breaking the saddle girth as she left the ground. This gave a curious picture of the mare with her legs wildly spread and the broken girth swinging in the air just as it is separating. This series of pictures are also very interesting but difficult of description. They show, however, the gait of the running horse exactly, and in a manner before impossible. A long description even would be unintelligible, while the photographs show the whole stride at a glance.

With the trotting horse the motion of each foot can be followed throughout the stride, and accurate measurements taken by the aid of the vertical and horizontal lines. It is curious to notice that the propelling power of the horse seems all in the hind legs, while the front ones seem only used to support the body. Another curious feature noticed was that the sulky was only on the ground about half the time. The ground was perfectly smooth and even, having been carefully rolled, and the powdered lime sifted on gave an excellent surface for observation. The track made by the wheels show they were moving in short bounds, as if the spring of the felloe between the spokes threw the wheel off the ground at the spokes. The wheel would make a mark for about six inches, and then none for about four inches, and so on with considerable regularity.

Gov. Stanford has gone to considerable trouble and expense in having these experiments conducted so thoroughly, and Mr. Muybridge, who is an enthusiast in his art, has carried them out skillfully. The electrical portion of the appliances were made in this city by the San Francisco Telegraph Supply Co. The results are highly satisfactory, and cannot be caviled at. Quite a number of gentlemen witnessed the experiments, among them representatives of the principal daily and weekly papers, and quite a number who make turf matters a specialty. The application of electricity as an adjunct to the camera was perfectly satisfactory in every respect, and the pictures were as accurate as possible. The series of photographs will be of great interest to all having any interest in horses, as they show conclusively how the stride is accomplished at high speed, a subject on which there has been a wide difference of opinion. These pictures, however, settle the matter conclusively, and many will have to give up their ancient prejudices.

We would like, did space permit, to give some description of Gov. Stanford's magnificent place, but it would require several columns to give even an idea of it. The ranch is a short distance from Menlo Park Station, on the S. P. R. R. Around the residence are highly cultivated and ornamental grounds, kept in the neatest order possible, with handsome large stables for the house-horses and carriages, numerous outbuildings, etc. Smooth gravel roads and paths run in all directions and there is a pleasant mile drive up to the large stables where the fancy stock are kept. Here is a very large, handsome stable, where "Occident" and several more valuable animals are kept each in a fine box stall by himself, with all the stable appliances necessary for comfort and health. Extending around this stable on two sides is a long row of low buildings, divided into box-stalls, for other blooded stock. Fields near by are divided up, so as to leave pastures for the yearlings, the mares with and without colts, etc. There are also a group of buildings for the trainers, grooms, hostlers, etc. A bandstand laid-out track passes near by the stables, on which the horses are exercised and trained. The Governor has over 200 head of blooded stock. The horses were all brought out on the occasion of our visit and showed careful grooming and good care. They are all, without exception, thoroughbred, and some of them cost pretty long prices. The Governor's idea is that this climate is the best in the world for breeding thoroughbred horses, and he has procured the best he could find to breed from, being satisfied that the coming trotter will be a native of California. He is using every endeavor to improve the breed of our horses and expresses a very laudable desire to see the turf freed of its obnoxious features, so that its standard will be such that its patrons may once more take a pride in it, which is not at present the case.

THE ENDOWMENT.—In this mine, situate in Columbus district, Esmeralda county, Nevada, there has been struck, says the *Belleville Times*, a splendid and apparently permanent four-foot deposit of ore on the 400 level, 300 feet east of the before uncovered body of sulphuret ore. The ore runs \$155 per ton and has been opened on the 400 and 500 levels.

MORE GRAPHITE.—Major Dreihelbis has discovered an immense deposit of what he believes to be graphite, about 25 miles from Winnemucca. The material is of a black color, very light, soluble in water, has a metallic luster, and marks paper similar to a lead pencil.—*Silver State*.

Smedberg's Improved Pelouze and Audoin Condenser.

The mechanical separation of vapors held in suspension by large volumes of gaseous matter has long been one of the most difficult problems of technology. This difficulty is more particularly felt upon this coast by our gas and quicksilver men, and it is to call to their attention to what we deem to be a very successful move in this direction that this article has been written.

Our attention was lately called to the Pelouze and Audoin condenser, by an article in the *Polytechnic Review*. We had studied the subject up in the journals, when we learned that the well-known gas engineer of San Francisco, Mr. James R. Smedberg, was agent for the machine on the coast, and had added to it several improvements of his own. We take pleasure, therefore, in describing the apparatus as it appears at present with his latest improvements.

Of the original inventors, M. Pelouze is the manager and M. Audoin the chief of the chemical works of the Paris Gas Company. These names are already well known for their contributions to science and technology and by their various researches in laws of combustion and the other phenomena of gas lighting.

The theory which these gentlemen hold in common with Halley, Tyndall, Saussure, Kratzenstein, Bravais and many other physicists is that these molecular aggregations of liquids float in the air for such long periods of time because they are not only very small and therefore expose great surface in proportion to their weight, but also because they are hollow spheres and hence their surface is still more augmented. Others hold that these particles are solid. It is altogether probable that these vesicles are spherical in shape, and assuming this, it follows that if any liquid be broken up into spherical globules, say 1-10,000th of an inch in diameter, that any given weight, say one pound of this liquid, will expose 6,000 times as much surface to the air as the same pound of liquid in spheres one inch in diameter. It seems therefore not to be a matter of vital importance to settle whether these globules be solid or hollow, even if it were possible, as it is not. But all physicists are agreed that between these globules exists a repellent force like that which exists in the gaseous state. This repulsion increases with the temperature and is supposed to cease at 273° below zero C., where all bodies are supposed to be in a liquid state.

The various modes of overcoming these repellent forces and of, therefore, relieving the vapor by an agglomeration of the particles, are chiefly cooling and compression. Either or both of these means are effective in changing a gas into its liquid form, and as has been recently shown, when combined with sudden evaporation, they are capable of reducing even the gases, hydrogen, oxygen, nitrogen and the air we breathe to the liquid and even the solid state.

But in practice it is found that in cooling ordinary crude coal gas down even to 60° Fah., there still remains from 10% to 15% of tarry and aqueous vapors suspended mechanically, although the boiling point of coal tar is about 500° Fah., and that of water 212° Fah.

There are now three ways in which these vesicles may be removed—by chemical affinity, by friction, by impact. In each of the two latter the force acting are adhesion and cohesion also, as will be seen shortly.

Chemical affinity has long been used in the laboratory, but it is difficult of application on the large scale, although we are of the opinion that it might not be valueless in the condensation of quicksilver vapors.

Friction has been successfully used in purifying crude gas in the Eastern States. The escaping vapors were compelled to traverse a hollow corrugated prism, by which means the tar vesicles were retained by the roughened walls, while the gas passed on. But this friction condenser was at best a clumsy and at the same time a costly instrument, as it had to be made of sufficient size to expose each particle in turn to the action of the walls.

There remains one principle which can be brought into operation, the principle of impact. And here the beautiful simplicity of the Pelouze and Audoin condenser must be apparent. It consists of a drum floating in water, as in the accompanying diagram. This drum, in the improved apparatus of Mr. Smedberg, is fed from below with gas. The gas can only escape through the walls of this drum, which are composed of three plates of perforated sheet iron. These walls are spaced about one-eighth of an inch in the clear. The perforations are about 1-16th of an inch in diameter, and are so placed that each perforation is opposite a blank space in the next succeeding plate. The crude gas passing through these plates is thus broken into a multitude of minute jets and projected with an adjustable velocity against the blank spaces of two of the three plates.

As the drum is free to move vertically in its water lute, it is easily adjustable for any given pressure, and it moves then automatically, as the pressure of the inlet gas varies, for the line of flotation of the drum determines the number of side jets at work. This is one of Mr. Smedberg's improvements, as in the original apparatus the gas current came in the other direction, thus losing this automatic effect. The gas, when it has passed through the drum, then follows the direction of the arrow in the figure and passes down the gas channel shown in sec-

tion projecting outwards at the right hand side of the cylinder which encloses the drum in the figure.

The tar, water, etc., which is removed by the walls of the drum, trickles down into the flotation box, then overflows its edges and runs down into the tar overflow.

In the original apparatus there is a costly and complicated system of gas valves, by which means the current of gas is either sent through the apparatus or cut off. Mr. Smedberg accomplishes all this by a very simple arrangement, which is, however, difficult to describe without another figure. The whole of the under part of the apparatus which is in connection with the gas mains is stationary, while the whole of the apparatus above this is capable of being rotated 180° by means of the two handles which project horizontally from the lower part of the casing. From this rotating cylinder and down across the horizontal line of the gas main, hangs the valve arrangement. This consists essentially of a vertical diaphragm whose plane passes through the axis of the cylinder, and of a second which is at right angles to this, but extending only half way across, whose plane also passes through this axis. The lower cylinder is thus cut into three prisms; one has for its base a semicircle, the other two a quadrant. When the handles are turned, so as to bring the semicircular prism in connection with the two mains, the apparatus is "by passed" and the gas does not flow through the machine. When the handles are turned 180°, each of the "quad-

This also reduces the water necessary to remove ammonia and the lime required to arrest carbonic acid and sulphydric acid by about 10%.

3d. That the apparatus is compact, cheap and durable, as well as very easy of management.

4th. But not least, that the gas does not need to be exposed to the action of water, by which great loss of candle power results.

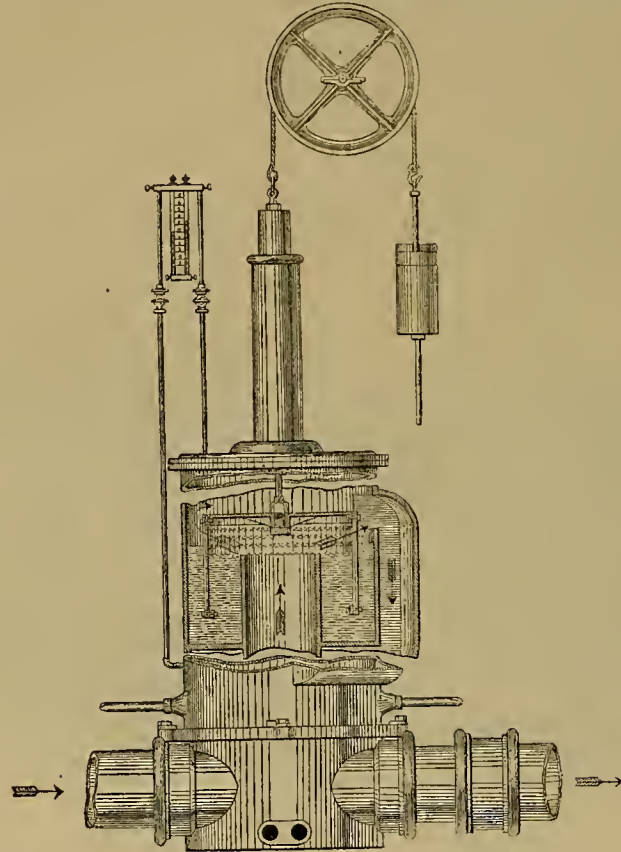
These condensers have been used very successfully in Europe, as appears in the journals, and have been in operation for several years successfully in San Francisco, Sacramento, Oakland, Modesto, Red Bluff, Petaluma, Napa, Inland, Asylum, Reno, Nevada, Boston, Mass., New Orleans, La., etc.

They are made in eight sizes to pass from 50,000 to 3,000,000 cubic feet per day. And we take pleasure in referring for further particulars to Mr. J. R. Smedberg himself, at 129 Beale street, San Francisco.

The New Timber Law.

Annexed is a certified copy of an act for sale of timber land in the States of California, Oregon, Nevada, and in Washington Territory.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That surveyed public lands of the United States within the States of California, Oregon and Nevada and in Washington Territory, not included within military, Indian, or other reservations of the United States, valuable chiefly for timber, but



THE SMEDBERG IMPROVED PELOUZE AND AUDOIN CONDENSER.

rant prisms" is opposite one of the gas mains. The one which receives the incoming gas, conveys it up a vertical pipe, whose upper end is shown in the section to the space beneath the drum, the other "quadrant prism" receives the gas from the "down take" on the side, and conveys the gas into the main. It is evident that when it is necessary to open the apparatus for repairs, etc., which, by the way, is seldom, it is only necessary to revolve the handles 180° and the condenser is by passed. In the larger sizes of apparatus this operation is effected by a tangent screw and ratchet. Another neat and useful addition of Mr. Smedberg's is his "differential gauge." This is shown in the figure at the left, and is so arranged as to give, by proper combination of valves, either the difference between the pressure of inlet and outlet gas, or the difference between either and that of the atmospheric air. It will be seen, therefore, how perfectly the whole apparatus is under the control of the operator. Any stoppage of the holes is at once apparent from the gauge, and the apparatus can be at once by passed. But the singular part of it is that these stoppages are very rare. Abundant certificates from well-known gas engineers proving that the drum kept clean for from six months to one year, and even then the only trouble necessary was a good steaming for three or four hours.

The advantages claimed for this condenser, and we believe fairly its due, are as follows: 1st. Complete separation of the tar. This not only saves the tar for fuel or for sale, but greatly relieves the scrubbers and lime boxes, thus not only saving labor and material, but enabling one to work with less back pressure.

2d. A concentration of the gas liquor, which it separates at the rate of about three gallons to the ton, at 7.9 Baume or specific gravity of 1.055.

unfit for cultivation, and which have not been offered at public sale according to law, may be sold to citizens of the United States, or persons who have declared their intention to become such, in quantities not exceeding 160 acres to any one person or association of persons, at the minimum price of \$2.50 per acre; and lands valuable chiefly for stone may be sold on the same terms as timber lands: *Provided*, That nothing herein contained shall defeat or impair any bona-fide claim under any law of the United States, or authorize the sale of any mining claim, or the improvement of any bona-fide settler, or lands containing gold, silver, cinnabar, copper, or coal, or lands selected by the said States under any law of the United States donating lands for internal improvements, education, or other purposes: *And provided further*, That none of the rights conferred by the act approved July 26th, 1866, entitled "An act granting the right of way to ditch and canal owners over the public lands, and for other purposes," shall be abrogated by this act; and all patents granted shall be subject to any vested and accrued water rights, or rights to ditches and reservoirs used in connection with such water rights, as may have been acquired under and by the provisions of said act; and such rights shall be expressly reserved in any patent issued under this act.

SEC. 2. That any person desiring to avail himself of the provisions of this act shall file with the register of the proper district a written statement in duplicate, one of which is to be transmitted to the General Land Office, designating by legal subdivisions the particular tract of land he desires to purchase, setting forth that the same is unfit for cultivation, and valuable chiefly for its timber or stone; that it is uninhabited; contains no mining or other improvements, except for ditch or canal purposes, where

any such do exist, save such as were made by or belong to the applicant, nor, as deponent verily believes, any valuable deposit of gold, silver, cinnabar, copper or coal; that deponent has made no other application under this act; that he does not apply to purchase the same on speculation, but in good faith to appropriate it to his own exclusive use and benefit; and that he has not, directly or indirectly, made any agreement or contract, in any way or manner, with any person or persons whatsoever, by which the title which he might acquire from the government of the United States should inure, in whole or in part, to the benefit of any person except himself; which statement must be verified by the oath of the applicant before the register or the receiver of the land-office within the district where the land is situated; and if any person taking such oath shall swear falsely in the premises, he shall be subject to all the pains and penalties of perjury, and shall forfeit the money which he may have paid for said lands, and all right and title to the same; and any grant or conveyance which he may have made, except in the hands of bona-fide purchasers, shall be null and void.

SEC. 3. That upon the filing of said statement, as provided in the second section of this act, the register of the land-office, shall post a notice of such application, embracing a description of the land by legal subdivisions, in his office, for a period of 60 days, and shall furnish the applicant a copy of the same for publication, at the expense of such applicant, in a newspaper published nearest the location of the premises, for a like period of time; and after the expiration of said 60 days, if no adverse claim shall have been filed, the person desiring to purchase shall furnish to the register of the land-office satisfactory evidence, first, that said notice of the application prepared by the register as aforesaid was duly published in a newspaper as herein required; secondly, that land is of the character contemplated in this act, unoccupied and without improvements, other than those excepted, either mining or agricultural, and that it apparently contains no valuable deposits of gold, silver, cinnabar, copper, or coal; and upon payment to the proper officer of the purchase money of said land, together with the fees of the register and the receiver, as provided for in case of mining claims in the 12th section of the act approved May 10th, 1872, the applicant may be permitted to enter said tract, and on the transmission to the General Land Office of the papers and testimony in the case, a patent shall issue thereon: *Provided*, That any person having a valid claim to any portion of the land, may object in writing, to the issuance of a patent to lands so held by him, stating the nature of his claim thereto; and evidence shall be taken, and the merits of said objection shall be determined by the officers of the land-office, subject to appeal, as in other land cases. Effect shall be given to the foregoing provisions of this act by regulations to be prescribed by the Commissioner of the General Land Office.

SEC. 4. That after the passage of this act it shall be unlawful to cut, or cause or procure to be cut, or wantonly destroy, any timber growing on any lands of the United States, in said States and Territories, or remove, or cause to be removed, any timber from said public lands, with intent to export or dispose of the same; and no owner, master, or consignee of any vessel, or owner, director, or agent of any railroad, shall knowingly transport the same, or any lumber manufactured therefrom; and any person violating the provisions of this section shall be guilty of a misdemeanor, and, on conviction, shall be fined for every such offense a sum not less than \$100 nor more than \$1,000, *Provided*, That nothing herein contained shall prevent any miner or agriculturist from clearing his land in the ordinary working of his mining claim, or preparing his farm for tillage, or from taking the timber necessary to support his improvements, or the taking of timber for the use of the United States; and the penalties herein provided shall not take effect until 90 days after the passage of this act.

SEC. 5. That any person prosecuted in said States and Territory for violating section two thousand four hundred and sixty-one of the Revised Statutes of the United States, who is not prosecuted for cutting timber for export from the United States, may be relieved from further prosecution and liability therefor upon payment, into the court wherein such action is pending, of the sum of \$2.50 per acre for all lands on which he shall have cut or caused to be cut timber, or removed or caused to be removed the same: *Provided*, That nothing contained in this section shall be construed as granting to the person hereby relieved the title to said lands for said payment; but he shall have the right to purchase the same upon the same terms and conditions as other persons, as provided hereinbefore in this act: *And further provided*, That all moneys collected under this act shall be covered into the Treasury of the United States. And section four thousand seven hundred and fifty-one of the Revised Statutes is hereby repealed, so far as it relates to the States and Territory herein named.

SEC. 6. That all acts and parts of acts inconsistent with the provisions of this act are hereby repealed.

Approved, June 3d, 1878.

Department of State, Washington, June 7th, 1878.—A true copy. SEVELLON A. BROWN.

THE Mechanics' Union at Virginia City, Nevada, are demanding \$5 per day, which it is thought the mining companies will consent to pay them.

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Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced Inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

Foreign Patents.

In addition to American Patents, we secure, with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Peru, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and permanently established.

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We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than any other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of inventions discovered here than any other agents.

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We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

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JOHN ARGALL. [Seal.]

STATE OF CALIFORNIA,
CITY AND COUNTY OF SAN FRANCISCO, } ss.
On the twenty-fourth day of May, A. D., one thousand eight hundred and seventy-eight, before me, J. Robert Read, a notary public in and for said city and county, residing therein, duly commissioned and sworn, personally appeared William H. Birch and John Argall, known to me to be the persons described in, whose names are subscribed to, and who executed the annexed instrument, and they acknowledged to me that they executed the same.

In witness whereof I have hereto set my hand and affixed my official seal, at my office, in the city and county of San Francisco, the day and year last above written.

J. ROBERT READ, Notary Public.

[Seal.]

Endorsed—Filed May 20th, 1878.

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PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch from Washington, D. C.

Week Ending June 4th.

CAR COUPLINGS.—Charles H. Wood, Seattle, W. T. TURNING CHISELS.—Homer C. Emery, Union, Ogn. HERRERS.—Joseph Decombe, S. F., Cal. METHODS OF CURING FISH.—Lynnan Woodruff, Ellensburg, Ogn.

TRADEMARKS.

MEDICAL COMPOUND.—Charles Rowell, S. F., Cal.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. NOR.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at two lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

A Use for Everything.

A more worthless thing than the share certificates of a defunct wild-cat mine, it would be difficult to conceive of. Yet even these have at last been utilized. Many mercantile, and other business failures in the East, have been attributed, during the past four years, to investments in losing speculations, such as mining and railroad stocks, that have declined to merely nominal values, and in some instances there was room to believe that such things were not always the true cause of the failures. The *Engineering and Mining Journal* makes the following statement in regard to the matter:

It has come to our knowledge that there is a constant inquiry and demand from business firms which contemplate "making an assignment" for large quantities of stocks of some mine more or less known. It is not at all essential that the mine be worth anything, but it is essential that a large amount of the stock be obtainable for very little value in the form of hoots and shoes, drygoods, hardware or nicknacks. The stock makes a fine show in the list of assets, and gold and silver mining gets the credit of having caused the failure, and is condemned by each of the bankrupt's numerous creditors as "runious to any one going into it." We commit this point to those whom it may concern.

COST OF TRANSPORTING PETROLEUM.—When Mr. Regan's bill to regulate inter-State transportation by railroad was under discussion in the House, May 9th, Mr. Thompson, of Pennsylvania, said that, last season, 13,000,000 barrels of oil, produced in Pennsylvania, had been shipped to the seaboard. The established rate of transportation was \$1.50 per barrel, which should have given to the railroad companies \$18,500,000. But instead of that the railroad companies had actually received only \$5,000,000, the other \$13,500,000 having been diverted from the stockholders and from the shippers into the pockets of an unscrupulous ring. The bill proposed to abolish that system. In illustration of the magnitude of the oil interest, he said that although 15 years ago it was an article entirely unknown to commerce, now it stood second on the list of exports (cotton being the first), and that it brought back more gold to the country than all the wheat or flour or bacon or beef or lard or lumber or tobacco or any other commodity exported.

THE RIGHT WAY AND THE WRONG.—Mining, like all other business, must be conducted with economy, and wants a practical miner at its head. Nearly all the failures of Eastern investments have been caused by sending out some friend or relative of some of the company to take charge of the mines, who has not the slightest idea of how silver and gold mines are found, let alone how they should be worked. Theory is good and practice is better, but theory and practice are above either, alone. Let your metallurgical students go into the mines and there learn to swing the pick, to drill, to blast, and to distinguish ore from barren rock; let them go into the field and become familiar with the practical part of mining life, and then less money will be thrown away and squandered, and many a valuable property, in place of being condemned, will be made to yield many returns for the money invested.—*Eureka Sentinel.*

SULPHUR-MAKING IN NEVADA.—A. R. Doan, the proprietor and inventor of the steam wagon which has been hauling crude sulphur for the San Francisco sulphur company, has thrown up his contract and will take his wagon to Rye Patch, where he has contracted to haul ore from the mine to the mill. The California & Nevada sulphur company will ship 20 tons of sulphur to-day. This company have been putting in new steam works, and, when completed, expect to run out about 10 tons of refined sulphur a day. Some two weeks ago they met with an accident at the foundry, where their retort was cast, by the explosion of the same when giving it the proper test which the law requires. The company have now received the retort at this station, and it is no light yet either. Its weight is some pounds over four tons and a half.—*Silver State.*

SOLAR STEAM POWER.—We recently mentioned the experiments of W. Adams, of Bombay, India, in boiling water by the heat of the sun; he has lately tried further experiments, as follows: In the presence of several gentlemen of Bombay, nine gallons of water were poured into a small boiler at 9:25 A. M. The rays of the sun were then directed on the boiler, and the water boiled in exactly 30 minutes. After boiling exactly one hour the focus was turned off, when it was found that three and three-quarters gallons had been evaporated. In the experiment described above, he used 198 glass mirrors, each 15 by 94 inches.—*Scientific American.*

STEEL RAILS IN FRANCE.—In 1877, the railway companies of France were purchasers of iron rails to the extent of 48,888 tons, while 136,549 tons of steel rails were required. A comparison with the corresponding figures of 1876 (57,936 tons of iron and 130,681 tons of steel rails), shows a notable decrease in the consumption of iron rails and a corresponding increase in the consumption of steel rails.

Woodward's Gardens were never more attractive than at present. Besides the lions already mentioned, six monster living alligators, several iguanas and a box-constrictor have just been added. New states are constantly engaged for the Pavilion exercises. Rates of admission as usual.

EXAMINE the accelerated endowment plan, as originated by the Mutual Benefit Life Insurance Co., of Newark, New Jersey. Assets, \$30,533,429.94. Lewis C. Grover, President; L. Spencer Coble, Vice-President; Benjamin C. Miller, Treasurer; Edward A. Strong, Secretary; Bloomfield J. Miller, Actuary. Send for circulars to James Mansell, Jr., agent of insured, 224 Sansome St., San Francisco.

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[WHOLESALE.]

WEDNESDAY M., June 19, 1878.

BAGS—Jobbing.	Plaster, Golden
Eng Standard Wheat, 11 1/2 @ 11 1/2	Gate Mills, 3 00 @ 3 25
Neville & Co's	Lard Plaster, to 10 00 @ 12 50
Hand Sewed, 22x36, 11 1/2 @ 11 1/2	NAILS.
24x36, 11 1/2 @ 11 1/2	Assorted sizes, 25 @ 25
Machine Sd, 22x36, 11 1/2 @ 11 1/2	OILS.
Flour Sacks, halves, 8 1/2 @ 10 1/2	Pacific Blue Co's
Quarters, 5 1/2 @ 6 1/2	Nuts, 10 1/2 @ 10 1/2
Eighties, 4 1/2 @ 4 1/2	Castor, No. 1, 10 @ 10
Hessian, 60 lb, 15 @ 15	do, No. 2, 10 @ 10
45 lb, 12 @ 12	Baker's, 5 @ 5
40 lb, 10 @ 10	Olives, 5 @ 5
35 lb, 8 @ 8	Possel, 4 1/2 @ 4 1/2
Hand Sewed, 31 lb, 4 1/2 @ 5 1/2	Palm, 10 @ 10
4 lb, 10 @ 10	Linseed, Raw, 10 @ 10
Machine Sewed, 4 1/2 @ 4 1/2	Edible, 10 @ 10
Standard Gunnies, 14 @ 15	Cocoanut, 5 @ 5
Bean Bags, 7 @ 8	China nut, 8 @ 8
CANNED GOODS.	Sperm, 40 @ 40
Assorted Pie Fruit	Polard, 40 @ 40
2 lb cans, 3 75 @ 3 75	Polar, refined, 40 @ 40
Table do, 3 75 @ 3 75	Lard, 20 @ 20
Jams and Jellies, 4 25 @ 4 25	Oleophine, 7 @ 7
Pickles, 1/2 gal, 3 50 @ 3 50	Devon's Bril, 25 @ 25
Sardines, 1/2 doz, 1 50 @ 1 50	Coast Whales, 10 @ 10
HF Boxes, 3 00 @ 3 00	Noupareil, 35 @ 35
Preserved Beef.	Eureka, 40 @ 40
2 lb, doz, 4 00 @ 4 00	Barrel kerosene, 20 @ 20
do Beef 4 lb, doz, 5 50 @ 5 50	Downer Kern, 40 @ 40
Preserved Mutton, 4 00 @ 4 00	Elaine, 25 @ 25
2 lb, doz, 4 00 @ 4 00	PAINTS.
Beef Tongue, 6 50 @ 6 50	Pure White Lead, 90 @ 104
Preserved Ham, 5 50 @ 5 50	Whiting, 12 @ 12
Devil Ham, 1 lb, 5 50 @ 5 50	Putty, 4 @ 5
do Ham 4 lb, doz, 3 00 @ 3 00	Chalk, 2 @ 2
COAL—Jobbing.	Coal, 2 @ 2
Australian, 7 00 @ 7 25	Green, 10 @ 10
Coos Bay, 6 50 @ 7 00	Ch Yellow, 3 00 @ 3 50
Bellingham Bay, 6 50 @ 6 50	Light Red, 3 00 @ 3 50
Seattle, 5 50 @ 6 50	Metallic Roof, 1 30 @ 1 50
Cumberland, 14 00 @ 14 00	RICE.
Mt Diablo, 4 75 @ 6 00	China No. 1, 10 @ 8 1/2
Lehigh, 22 00 @ 22 00	Hawaiian, 8 @ 8
Liverpool, 7 50 @ 8 00	SALT.
West Hartley, 7 50 @ 8 00	Cal. Bay, 15 00 @ 22 50
Seaboard, 6 50 @ 7 00	Cal. Cane, 10 00 @ 12 00
Scranton, 13 00 @ 16 00	Carmen Id., 10 00 @ 22 50
Vancouver Id., 7 50 @ 8 00	Liverpool Id., 20 00 @ 22 50
Orcharcoal, sack, 75 @ 80	SOAP.
Coke, hbl, 60 @ 60	Castle, 10 @ 10 1/2
COFFEE.	Common brand, 4 @ 6
Sandwich Id., 21 @ 21	Fancy brand, 7 @ 8
Costa Rica, 18 @ 19	SPICES.
Guatemala, 18 @ 18 1/2	Cloves, 45 @ 50
Java, 23 @ 25	Cassia, 22 @ 25
Manila, 18 @ 18 1/2	Peppercorns, 15 @ 17
Ground, 25 @ 25	Pepper Grain, 15 @ 15
FISH.	Pimento, 15 @ 16
Sac'to Dry Cod, 5 @ 5 1/2	Mustard, Cal., 1 50 @ 1 50
do in cases, 6 1/2 @ 7 1/2	SUGAR, ETC.
Eastern Cod, 8 @ 8 1/2	Cal. Cane, 11 1/2 @ 11 1/2
Salmon, hbls, 9 @ 10 00	Powdered, 11 1/2 @ 11 1/2
Hi lb, 5 @ 5 50	Fine crushed, 11 1/2 @ 11 1/2
2 lb cans, 10 @ 10 30	Granulated, 11 @ 11
Pild Cod, hbls, 22 00 @ 22 00	Golden O., 70 @ 70
Hi lb, 11 00 @ 11 00	Cal. Syrup, 70 @ 70
Mackerel, No. 1, 11 00 @ 12 00	Hawaiian Molasses, 26 @ 30
In Kits, 2 25 @ 2 25	TEA.
Ex Mess, 3 50 @ 4 50	Young Hyson, 35 @ 50
Pild Herring, 3 00 @ 3 50	Morjone, 35 @ 50
Boston Smoked Hy, 40 @ 60	Country pckd Gum, 50 @ 60
LINE, ETC.	powder & Imperial, 50 @ 60
Lime, Sta Cruz, 2 00 @ 2 25	Hyson, 30 @ 35
bbi, 2 00 @ 2 25	Poco-Chow, 40 @ 60
Cement, Rosen, 2 75 @ 3 50	Japan, 1st quality, 40 @ 60
Portland, 4 75 @ 5 50	2d quality, 25 @ 35

WEDNESDAY M., June 19, 1878.

CARGO PRICES OF PUGET SOUND PINE.	RETAIL PRICE.
REDWOOD.	
Rough, M., 13 00	Rough, M., 18 00
Refuse, 9 00	Flooring and Step, 23 00
Clear, 23 00	Narrow, 30 00
Clear Refuse, 13 00	2d quality, 25 00
Refuse, 18 00	Furring, 3 50
Surfaced, 20 00	REDWOOD.
Refuse, 14 00	RETAIL PRICE.
Flooring, 22 00	Rough, M., 18 00
Refuse, 12 00	Refuse, 14 00
Beards Flooring, 23 00	Pickets, Rough, 15 00
Refuse, 13 00	Pointed, 15 00
Half-inch Siding, 16 00	Fancy, 22 00
Refuse, 14 00	Shingles, 20 50
Half-inch Surfaced, 20 00	Surfaced & Long Beards, 20 50
Refuse, 14 00	Flooring, 30 00
Half-inch Battens, 16 00	Refuse, 22 50
Pickets, Rough, 11 00	Half-inch Surfaced, 30 00
Rough, Pointed, 12 50	Rustic, No. 1, 30 00
Fancy, Pointed, 18 00	Battens, 1st ft., 30 00
Shingles, 1 75	Shingles, 2 00

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Refuse, 14 00	Flooring, 30 00
Half-inch Battens, 16 00	Refuse, 22 50
Pickets, Rough, 11 00	Half-inch Surfaced, 30 00
Rough, Pointed, 12 50	Rustic, No. 1, 30 00
Fancy, Pointed, 18 00	Battens, 1st ft., 30 00
Shingles, 1 75	Shingles, 2 00

METALS.

[WHOLESALE.]

WEDNESDAY, M., June 19, 1878.

IRON.	
American Pig, ton, 28 00 @ 30 00	
Scotch Pig, ton, 28 00 @ 30 00	
White Pig, ton, 28 00 @ 30 00	
Oregon Pig, ton, 28 00 @ 30 00	
Refined Bar, 21 @ 21 3	
Horse Shoes, keg, 5 00 @ 5 00	
Nail Rod, 10 @ 10	
Norway, Oval, 7 @ 7	
COPPER.	
Sheathing, lb, 24 @ 35	
Sheathing, Yellow, 21 @ 21	
Sheathing, Old Yellow, 21 @ 21	
Composition Bolt, 24 @ 24	
Composition Bolt, 24 @ 24	
STEEL.	
English Cast, lb, 13 @ 14	
Anderson & Woods, ordinary sizes, 15 @ 15	
Drill, 15 @ 15	
Flat Bar, 14 @ 19	
Pow Steel, 8 @ 12 1/2	
10x14 C Charcoal, 7 50 @ 8 50	
Banca Tin, 23 @ 24	
Australian, 17 @ 17 1/2	
ZINC.	
By the Cask, 9 @ 9	
Zinc Sheet 13 ft, 7 to 10, lb, 9 @ 10	
7x3 ft, 11 to 14, 10 @ 10	
8x4 ft, 8 to 10, 11 @ 11	
8x4 ft, 11 to 10, 11 @ 11	
NAILS.	
Assorted sizes, 3 15 @ 3 25	
QUICKSILVER.	
By the lb, 43 @ 45	

LEATHER.

[WHOLESALE.]

WEDNESDAY M., June 19, 1878.

Sole Leather, heavy, lb, 22 @ 29	
Light, 20 @ 24	
Jodot, 8 Kil, doz, 48 00 @ 50 00	
11 to 13 Kil, 65 00 @ 75 00	
14 to 19 Kil, 30 00 @ 50 00	
Second Choice, 12 to 16 Kil, 65 00 @ 70 00	
Cornellian, 12 to 16 Kil, 57 00 @ 67 00	
Females, 12 to 13 Kil, 63 00 @ 67 00	
14 to 16 Kil, 71 00 @ 75 00	
Simon Ulmo, Females, 12 to 13 Kil, 65 00 @ 70 00	
14 to 15 Kil, 65 00 @ 70 00	
16 to 17 Kil, 72 00 @ 74 00	
Simon, 18 Kil, 61 00 @ 63 00	
20 Kil, 65 00 @ 67 00	
24 Kil, 67 00 @ 74 00	
Robert, Calif, 7 and 9 Kil, 35 00 @ 40 00	
Kips, French, lb, 1 00 @ 1 35	
Cal, doz, 40 00 @ 40 00	
French Sheep, all colors, 8 00 @ 15 00	
Eastern Rags for Backs, lb, 1 00 @ 1 25	
Sheep Rags for Topping, all colors, doz, 9 00 @ 13 00	
For Linings, 5 50 @ 10 50	
Cal, Russet Sheep Linings, 1 75 @ 4 50	
Boot Legs, French Cal, pair, 4 00 @ 4 25	
Best Jodot Calf, 6 00 @ 7 75	
Leather, Harness, lb, 35 @ 38	
Fair Bridle, doz, 48 00 @ 72 00	
Skinning, lb, 33 @ 37	
Well, doz, 30 00 @ 50 00	
Buff, lb, 18 @ 20	
Wax Side, 17 @ 18	

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, June 19, 3 P. M.

LEGAL TENDERS IN S. F., 11 A. M., 39 1/2 @ 39 1/2. SILVER, 2 1/2 @ 2.33. GOLD IN NEW YORK, 100 1/2.
GOLD BARS, 890 @ 910. SILVER BARS, 8 @ 15 1/2 cent. discount.
EXCHANGE ON NEW YORK, 1 1/2, on London bankers, 49 @ 49 1/2. Commercial, 60; Paris, 5 francs @ dollar; Mexican dollars, 93.
LONDON Consols 95 11-16; Bonds, 105 1/2.
QUICKSILVER IN S. F., by the tank, lb, 46 @ 47 1/2.

Signal Service Meteorological Report.

Week Ending June 18, 1878.

HIGHEST AND LOWEST BAROMETER.

HIGHEST AND LOWEST BAROMETERS.						
June 12	June 13	June 14	June 15	June 16	June 17	June 18
29.84	29.95	30.03	32.01	30.91	29.97	29.98
29.78	29.84	29.99	29.91	29.87	29.83	29.95
MINIMUM AND MAXIMUM THERMOMETER.						
63	61.5	61	60	69	63	65
53	53	63	53	61	51	53
MEAN DAILY HUMIDITY.						
75	79	77	78	76	73	76
PREVAILING WIND.						
SW	W	SW	SW	W	SW	SW
WIND—MILES TRAVELED.						
303	304	345	315	429	347	260
STATE OF WEATHER.						
Fair.	Fair.	Cloudy	Cloudy	Clear.	Fair.	Fair.
RAINFALL IN TWENTY-FOUR HOURS.						

Amusements.

CALIFORNIA THEATER.

BARTON & LAWLER, Lessee and Manager.
 BARTON HILL, Acting Manager.

JOSEPH JEFFERSON.

Bush Street, above Kearny. Open every evening. Box office open from 9 A. M. to 10 P. M. Seats may be secured six days in advance.

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THOMAS MAGUIRE, Manager.

JOE MURPHY.

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CHAS. E. LOCKE, Lessee and Manager.
 FRANK LAWLER, Acting Manager.

HARRIGAN & HART.

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From A Patentee.

HUNSAKER, TULARE CO., CAL., Jan. 15, 1878.

You will now receive my grateful heart-felt thanks for the able manner in which you have conducted the interest entrusted to you by me. Your acknowledged ability, confirmed to me as it is by the successful presentation of my claim for a patent on a pump power, not only delights me, but suggests the propriety of my continued patronage and that of all my friends. With kind wishes for your future success, I subscribe myself, yours respectfully,
 A. L. HUNSAKER.
 Messrs. DEWEY &

Iron and Machine Works.

HOS. PENDERGAST.

HENRY S. SMITH

ÆTNA IRON WORKS,

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Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

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AND

Model



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THORNTON THOMPSON.

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SHAFTING,BABY HOISTS,
VENTILATING FANS,
ROCK BREAKERS,
SELF-FEEDERS,
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PANS,
SETTLERS,
RETORTS,
ETC., ETC.

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Boiler repairs promptly attended and at a very moderate rates.

Pans, Settlers, Furnaces, Retorts, Concentrators, Or Feeders, Rock Breakers, Furnaces for Reducing Ore Water Jackets, Etc.

Sugar Machinery.

Crushing Rolls, Clarifiers, Vacuum Pans, Air Pumps, Concentrators, Bag Filters, Charcoal Filters, Blow-up Tanks, Coolers and Receiving Tanks.

Miscellaneous Machinery.

Flour Mill Machinery, Saw Mill Engines and Boilers, Dredging Machinery, Oil Well Retorts, Powder Mill Machinery, Water Wheels.

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Howell's Improved White Roasting Furnace.

This cut represents the most improved construction of this unrivaled Furnace, the superiority of which over all others as regards cost and capacity, as well as the economical and thorough oxidization and chloridization of ore, is now generally conceded.

In this Furnace, as covered by the Howell and White patents, are combined the three acknowledged requisites for the thorough and economical roasting and chloridization of ores.

First.—Continuous progression through and discharge of the ores from the furnace—while in the meantime they are, by being constantly showered through the heated air and gases within it, exposed in the greatest possible degrees to their reducing action.

Second.—Subjecting the ores to this showering process any length of time that may be necessary, according to the character of the ore, for its thorough reduction. In passing through the furnace it ordinarily falls about 1,000 feet, all the time in direct contact with the flame.

Third.—Increasing the heat on the ores as they are progressed through the furnace.

In this respect this furnace excels all others, as none of them combine all these essential requisites. It will chloridize the most refractory ores up to from 80% to 98% of their assay value, depending upon their nature and grade.

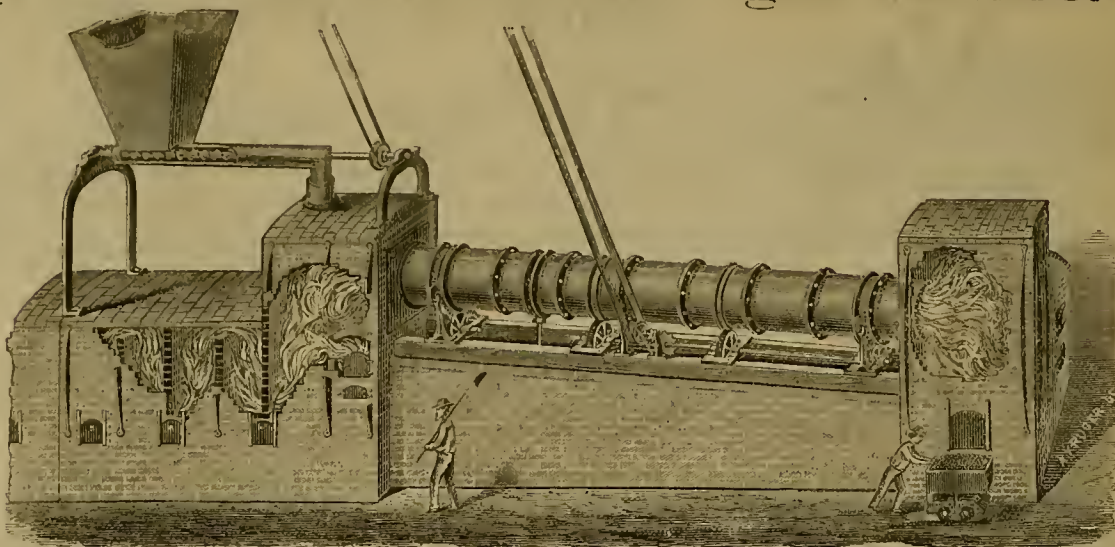
The first cost as well as the cost of operating it is less than that of any other furnace of equal capacity.

It requires no especial skill in management that cannot be readily acquired by any one capable of conducting an ordinary silver mill.

We manufacture various sizes adapted to a five, ten or twenty-stamp mill, and furnish plans by which any competent mill man can erect and operate it.

This furnace having the full or partial brick lined cylinder, embraces the devices covered by the patent to John Howell, as well as the original devices covered by the White patents, has been erected and operated successfully at the following mines in California, Nevada, Arizona and Montana: Camanche, Jefferson, Leopard, Utah, Star, Navajo, Grand Prize, Peck, Tiptop, Hackberry, Independence, Endowment and Alice. At least ten of them are now in active and successful operation, in some cases reducing ores of the most refractory character.

These facts are a sufficient attestation of the merits of this furnace.



The undersigned, with Mr. John Howell, are the sole owners of the Howell patent, and they have perfected arrangements with him, and also with Mr. James M. Thompson, who is a large owner in the White patent, and as such is possessed of as full and perfect rights and powers under the same as the patentee himself, by which they have acquired the exclusive right to manufacture these furnaces for the Pacific States and Territories. We hereby caution all parties against purchasing the same from any others but ourselves, or the said Howell or Thompson, as we shall prosecute all parties infringing upon the same. For particulars, price and terms, address

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STEINWAY & SONS Orders From Europe

Have increased to an extent, necessitating the establishment of Warerooms in London, England, and connected with it is a Concert Hall, the whole combined making the most elegant Piano Warerooms in Europe, and stands there as a monument of American genius and industry.

It is impossible to mention in the limited space of an advertisement the innumerable triumphs of this energetic firm. They stand foremost as inventors in Piano building in America, and in that respect, no small compliment to their inventions is the undeniable endorsement of all their competitors, as shown in their imitative efforts. Certain principles of the Steinways, are, however, so completely protected, that no imitation or substitute is attempted at all, and the shallow method of crying such inventions down are resorted to and relied upon.

The Steinways designed and perfected the Overstrung and Iron Frame systems. The application of the Agraffe Arrangements to Square and Upright Pianos. The Patent Duplex Scale, creating the most beautiful treble tones, (the Duplex Scale is of recent invention and only to be found in Pianos sold recently). The improved Double Dampers. The later idea extending the Agraffes to every string in the Piano. The highest finish to all parts of the instrument, including first quality of ivory, ebony, felt, cloth, etc. The wood and varnish of such first-class character, that the employment of large capital and experience alone permits.

The name of Steinway has become a "household word" in American homes, and the satisfactory record of 18 years' trial on the Pacific Coast, in itself assures the purchaser that the investment is no speculation, but one of perfect security.

The oft-repeated story of rival makers claiming to have been Steinways' foreman, etc.,

should have no weight with purchasers. An immense manufacturing business like the Steinway' is divided into departments for the various classes of work, and a foreman of one department superintends that alone, and cannot be perfected in other details.

The Steinways (a numerous family) are the inventors and designers of the principles of their pianos, and are alone responsible for the thorough execution of their own ideas.

In the Machinery Department at the late Centennial Exhibition, Steinways were awarded a special medal for an invention for testing their iron frames under a pressure of 5,000 pounds to the square centimeter. (This award was distinct from their medal for the best pianos exhibited.) The iron frames in Steinway pianos are the only ones so tested, and while other makers rely on castings from an ordinary foundry, the Steinways maintain their own foundry, and manufacture a frame of composite metal, which adds greatly to the resonant qualities of the instrument in general.

It often occurs that the attempt is made to raise the character of pianos constructed on less costly principles to the rank that the Steinway maintains, by naming a price, the same, or nearly so. This method is frequently exposed by the perfect willingness of the dealer to make astonishing discounts for cash, or extremely long credits; systems not entertained in any first-class business. In selling a Steinway piano, a guarantee of worth is given protecting the purchaser for five years, and catalogues issued by the Pacific Coast Agencies have a uniform rate of prices in gold, and where desired a liberal installment plan is offered to responsible buyers, with an additional charge of simple interest on deferred payments. Catalogue mailed on application to

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A thoroughly studied and ably written treatise on this subject by Hon. B. B. Redding, appears complete in the PACIFIC RURAL PRESS for January 26th, and also the MINING AND SCIENTIFIC PRESS. Based upon facts, figures and careful and extensive observations made in various parts of the State on this important subject, it is a volume of reliable information, interesting to every resident of the State. The information is condensed in a paper read before the California Academy of Sciences, and is published in the PRESS as read before that Society without any alterations or omissions. Extra copies, post-paid, 10 cents. Address DEWEY & CO., Publishers, 202 Sansome Street, San Francisco.

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CONNECTED WITH THIS HOTEL ARE

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Also on the river, looks out under shady trees and over green lawns, with a Grand View in a Direct Line of the Yosemite Falls, 2,634 Feet High.

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SCIENTIFIC PRESS.—As the old year is drawing to a close and the new is rapidly approaching, all our mining friends should subscribe for this scientific journal, especially devoted to their interests. It is a Californian enterprise, and compares favorably with similar organs of years more experience and age in the old countries.—*Colfax Enterprise.*

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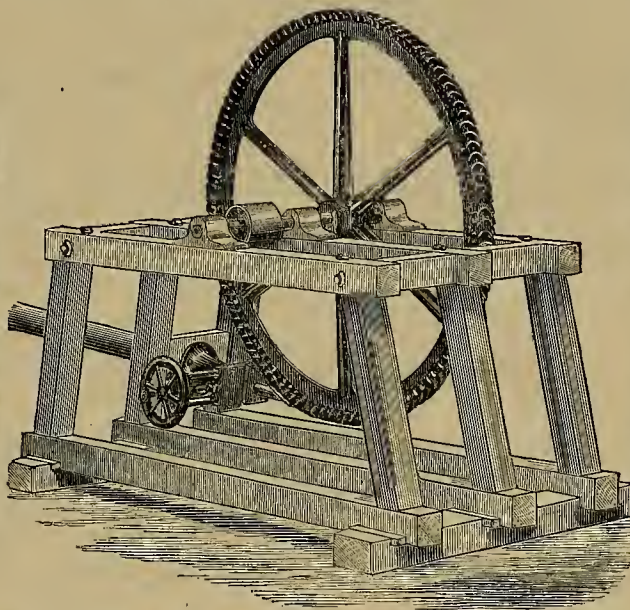
OLINE COMPOUND FOR LUBRICATING MACHINERY. FLOWER'S STOP-VALVES FOR STEAM, WATER OR GAS. PLANING, TONGUING, GROOVING AND DOUBLE SURFACING MACHINERY—PUTNAM'S MOORSE'S TWIST DRILLS. PATENT TWIST DRILL GRINDING MACHINE—VAN HAGAN'S. EMERY WHEELS AND STANDS. SAW GUMMERS—WOOD'S. STEAM INJECTORS.

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This wheel possesses more power for a given percentage of water than any yet offered to the public. They are in practical use in many Mills and Hoisting Works, and never fail to give entire satisfaction, which facts speak fully for their efficiency, and render further comment unnecessary.

This wheel possesses more power for a given percentage of water than any yet offered to the public. They are in practical use in many Mills and Hoisting Works, and never fail to give entire satisfaction, which facts speak fully for their efficiency, and render further comment unnecessary.

The KNIGHT WHEEL is used in the following named Mills and Hoisting Works, to whom the Public are referred:

- | | |
|--|--|
| 1-Eight-foot wheel, running Oucida Co.'s Mill, Amador county, Cal.; 60 stamps. Rob't Robinson, Supt. | 1-Eight-foot wheel, hoisting and driving pump at same company's mine. John Terhoun, Supt. |
| 1-Eight-foot wheel, running Con. Amador Mining Co.'s Mill, Amador county, Cal.; 40 stamps and two Hepburn pans. David Davis, Supt. | 1-Four and one-half foot wheel, running Bunker Hill Mining Co.'s Mill, Amador county, Cal.; ten stamps. John Palmer, Supt. |
| 1-Eight-foot wheel, running Lincoln Gold Mining Co.'s Mill, Amador county, Cal.; 40 stamps. | 1-Four and one-half foot wheel, running Gold Mountain Mining Co.'s Mill, Amador county, Cal.; ten stamps. J. C. Goodman, Supt. |
| 1-Eight-foot wheel, running pump at same company's mine. S. D. R. Stewart, Supt. | 1-Six-foot wheel, running St. Patrick's Mill, Newcastle, Placer county, Cal.; 15 stamps. Jno. Townsend, Supt. |
| 1-Eight-foot wheel, running Keystone Con. Mining Co.'s Mill, Amador county, Cal.; 40 stamps. | 1-Eight-foot wheel, hoisting and running pump, compressor and hoisting at Sbeba Silver Mining Co.'s Mine, State of Nevada. |
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| 1-Four and one-half foot wheel, running Original Co.'s Mill, Amador county, Cal.; 40 stamps, one pan, one rock-breaker. J. R. Johns, Supt. | 1-Four and one-half foot wheel, running Republic Mill; 20 stamps, Nevada county, Cal. E. H. Dyer, Supt. |
| 1-Four-foot wheel, running Gover Mining Co.'s new Mill, Amador county, Cal.; 20 stamps. | 1-Six-foot wheel, at the Plumas Eureka, running 48 stamps, two pans, two rock-breakers. Wm. Johns, Supt. |
| 1-Eight-foot wheel, running same company's old Mill; ten stamps. John Palmer, Supt. | 2-Six-foot wheels, sent up to Sierra Buttes Mines, one to run 50 stamps and the other to run pans. |
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Stronger, Better and Safer than any other High Explosive.

Judson Powder

IS NOW USED IN ALL LARGE HYDRAULIC CLAIMS.

It breaks more ground, pulverizes it better, saves time and money, and is superseding the ordinary powder wherever it is tried. *See Triple Force Caps and all Grades of Fuse.*

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FOR SALE—A Good Type-Writer. Price, \$50
For further information, address "COPYIST," this office.

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For Ventilating Mines and for Smelting Works.

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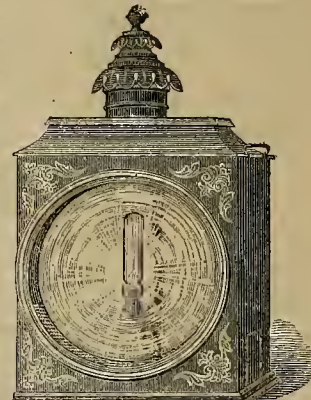
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110, 112, 114, 118 & 120 Battery St.,
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EMILE BOESCH,
(Patentee and Manufacturer.)
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JUNE 29, 1878.

VOLUME XXXVI.
Number 26.

The Stiles Rotary Engine.

We illustrate herewith a new form of rotary engine recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency by W. C. Stiles, of this city. The arrangement is such that both the force and expansive power of the steam can be exerted to drive an endless chain or belt, provided with suitable pistons which pass through the cylinders, and thus produce a rotary motion of the pulleys over which the belt passes, and from which the power may be taken.

As shown by the engraving, the engine consists of two horizontal cylinders mounted upon a suitable frame. At each end of the cylinders is a peculiarly-constructed pulley, or wheel, around which travels an endless steel belt or chain, which passes through the cylinders, and which is provided with pistons. These wheels are provided with recesses in their rims, which serve the double purpose of providing a seat for the pistons on the endless belt while they are passing around the pulleys, and also for preventing the belt from slipping on the wheels. The endless belt passing around these wheels has pistons attached to it at regular intervals so constructed and packed that they will fit snugly in the cylinders. One cylinder being placed above the other, the action of the steam on one cylinder is in the reverse direction to its action in the other. The cylinders consist of simple tubes, inside of which the pistons fit closely, being provided with proper packing to make them steam tight while passing through. At one end of each cylinder is a steam chest provided with a cut-off valve and gates. These gates are operated by an automatic sliding bar, a cam motion being given to a lever from the wheel upon which the belt travels, to open the gates of the cylinder at the proper instant to allow the pistons to enter. Just as they enter, the gates close behind them, making a steam-tight compartment, and the steam being admitted by the same action, the piston is forced through the cylinder, the other end of which is open, a continuous rotary motion of the pulleys thus being maintained. One piston is going through one cylinder as the other is going through the other in an opposite direction. The pistons are so arranged that one is taking a full head of steam, while the other is running on expansive steam. The exit of each piston allows the steam to escape freely, leaving no back action whatever. As the endless belt expands when heated, the slack is taken up automatically by having one of the pulleys set on a sliding carriage.

Mr. Stiles has one of these engines, an experimental one, now at work in the basement of the Cosmopolitan hotel, corner of Bush and Sansome streets, in this city. This has two brass cylinders five feet long by three and one-fourth inches bore, the pulleys being three feet three inches in diameter. Mr. Stiles states that this indicates 15 horse-power, running 300 feet per minute under 100 pounds of steam. The endless chain is 25 feet long, and is really a linked piston rod, passing through suitable stuffing boxes in the gates.

An engine of this class can be moved at any time, there being no heavy bed frame, but simply good strong framework. The inventor proposes to build one with two cylinders 20 feet long, 10-inch bore, to run 400 feet per minute, the whole engine to weigh about four tons. Steam may be cut off at any desired point and

allowed to work expansively the rest of the way. By this means the full force of the steam can be utilized, there being no opportunity for any back pressure whatever. By the peculiar construction described, a rotary steam engine is provided in which the full expansive force of the steam can be utilized, and the difficulties heretofore encountered in the practical working of rotary engines are avoided.

As to the advantages claimed by this style of engines over the reciprocating engines the inventor makes the following points: "That for instance in a small reciprocating engine of three to six inches bore of cylinder the length is five, six or eight inches, and there is a certain amount of back action every time the pistons go from one end of the cylinder to the other; hence in running the distance of 10 feet there would be 20 back actions. Now by taking the lowest back action laid down by the ablest writers, 3% has been lost every six inches run, which in 10 feet run would amount to just 3% of the whole power. Every time the piston moves from one end of the cylinder to the other the valve is opened to let the steam in and then closed; the valve to let the steam out is also opened and closed. This requires the moving of these valves twice each time the piston moves six inches, making or taking power 40 times in 10 feet. There is also loss when cutting off

Notices of Recent Patents.

Among the Patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

SPARK EXTINGUISHER.—John Johnson, Bloomfield, Sonoma county. The invention is an improvement in that class of extinguishers used in the smoke-stacks of engine furnaces, and in which water is employed in various forms to kill or quench the sparks. It consists in the employment of a rose-sprinkler, having minute perforations, through which water is forced upward in the same direction as that which the sparks move. It also consists in a novel arrangement of the perforations and the top of the sprinkler, in order to prevent the minute jets from being reunited by the exhaust, so as to form large drops or streams of water, as this will reduce the efficiency of the extinguisher, besides throwing the water and soot over all the machinery near. In the dry harvest fields, where there is a rainless climate as in this State, if an engine is used it is extremely dangerous to the surrounding combustible material and water is almost always scarce, so that the amount used for an extinguisher of

in strengthening the pocket opening and the angles of the pockets by the employment of peculiar strengthening bands which are stitched one along the lower and one along the upper edge of the pocket opening, each extending past the other and at the same time past the corner of the pocket opening so as to form a double supporting stay or re-enforce. The method of strengthening the pockets is simple and practical, and makes no material addition to cost of manufacture. The corners of the pockets are then supplemented with a number of thicknesses of cloth and diagonal stitching in addition to the cloth of the garment itself. This makes a strong, firm re-enforce or strengthening device which may be applied to any pocket in the classes of garments for which it is specially intended, and which is neat in appearance and simple of manufacture.

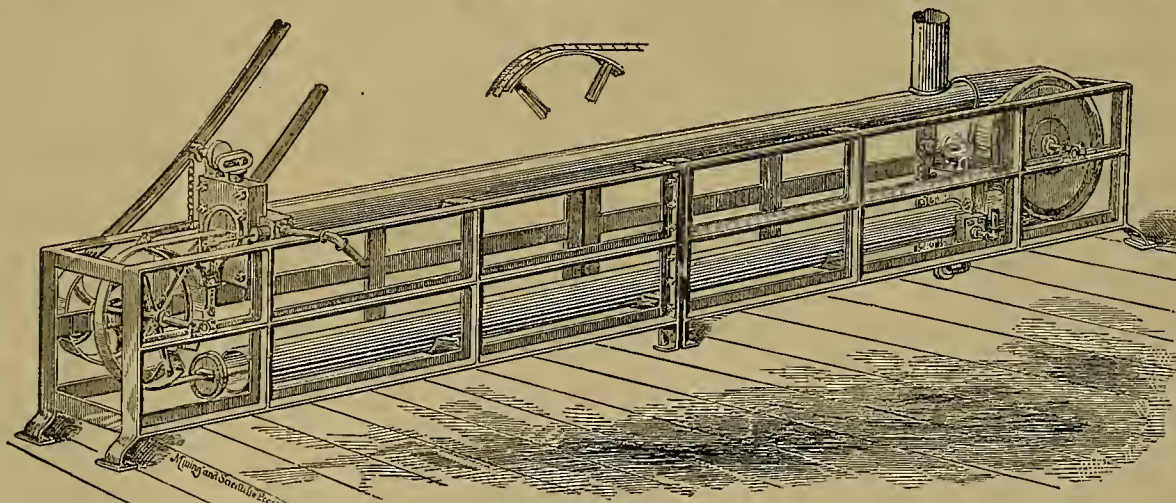
Close of the Volume.

With this number we close Volume XXXVI of the MINING AND SCIENTIFIC PRESS. A glance at the index on the last page will show of what a varied character the information given in these columns has been. Although mainly devoted to mining matters, we have by no means confined ourselves to this branch, but have gathered

from all sources facts and information of interest and value to the industrial classes. The work we have done speaks for itself, and we believe no constant reader can say he has not had value received. The firm foundation which our journal has secured in the public favor leads us to regard it more and more with pride, and to work the harder that its reputation for value and usefulness may be zealously maintained. We think that the closing volume may be considered in some respects better than those which preceded it, and we shall spare no effort to make this progressive improvement characteristic of the coming volume. As a new volume commences with the next issue, we take occasion to suggest that it is a good time for new subscribers to send in their names. While there is every reason for gratification at the circulation that this journal has reached, we are yet well aware that there are numbers of miners, mechanics and lovers of science to whom it might be a source of usefulness and profit. We feel no hesitation in urging the claims of the paper upon the notice of those for whose special benefit it is published. No one should be without a home paper devoted to their interests. It is the duty and pleasure of the editors to make the Press a welcome weekly visitor, and the more visits it pays the more welcome we can make it. The MINING AND SCIENTIFIC PRESS has now been published so many years by the same proprietors that experience has shown them exactly what is needed by the readers, and they intend endeavoring to improve the paper from year to year in the future as in the past.

FOR THE YOSEMITE.—Our devoted publishers, Messrs. Dewey and Ewer, have left their cares behind and chartering an express wagon and team have taken the overland route for the Yosemite, on a camping expedition of three weeks' duration. We bespeak them a kind greeting and a warm spot on the grounds of our readers to whose ranches they may come. They need the rest, and they have earned it, for their labors have not been light. May they return refreshed and invigorated.

THE EMPRESS OF GERMANY is reported as likely to visit Paris shortly in strict incognito.



THE STILES HERCULES ROTARY STEAM ENGINE.

steam in this class of engines, and in the crank motion and power required to run a large fly-wheel."

In this new rotary engine there is no back action of steam. The cylinders may be made of any desired length to 40 feet and upwards. The power is always given off at full leverage and pound for pound secured, less the friction. The steam ports and gates are moved but four times in going the length of a ten foot cylinder, or any length of cylinder, while they are moved 40 times in going that far in a small reciprocating engine, as above referred to. If there are any leaks they may be remedied at once. The steam may be cut off at any point and works expansively to the end of the cylinder. The exhaust may pass off up the pipe, shown in the engraving, on top of one end of cylinder, or may exhaust into a case containing the pulley.

In marine engines, for which the inventor considers this one specially adapted, heavy bed plates and working beams are done away with, and there is no extra iron and bracing required to strengthen the vessel. The first cost alone would be a great saving, to say nothing of the economy of working. The engine is well adapted to any kind of work. A company, called the "Stiles Hercules Engine Co.," has been formed to manufacture these engines, and further information may be had from the inventor at the Cosmopolitan hotel.

On the 22d inst. cloud hursts occurred in the mountains northeast of San Buenaventura, causing the Ventura river to pour down such a volume of muddy water that the ocean was discolored for a distance of six miles.

this class in addition to that required for an engine is an important feature. By the use of this device it is possible to perfectly quench the sparks with a small quantity of water. Various attempts have previously been made to use water to quench sparks and cinders before they leave the stack, either by throwing a thin sheet of water across the stack or by discharging the water into the exhaust pipe, or by some form of jet not specially intended for the purpose. These have failed, because of the tendency of the water to concentrate in larger streams or drops instead of being formed into a mist. Mr. Johnson's experience has proven that the water must be reduced to a most minute form before being discharged into the stack and then prevented from reuniting, and this apparatus effects it so thoroughly that no appreciable moisture is thrown out, but a dry mass of straw may be laid on top of the stack and it will not be ignited. It is a well-known fact that wet steam will quench the sparks better than a sheet or streams of water, and experience also shows that water in the form of sheets or streams will also impede the draft, so as to prevent keeping up steam with the damp fuel it is often necessary to use. With this device the water is practically so thoroughly united with the steam, which is often highly superheated, that it becomes practically a part of it and acts as wet steam. This effectually quenches the sparks and no bonnet is needed.

POCKET FASTENING FOR GARMENTS.—Berthold Greenebaum, S. F. This invention relates to an improvement in that class of garments known as overalls, jumpers, etc., and consists mainly

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds

Reducing Miners' Wages.

[Written for the Press by H. D.]

In responding to the demand for greater economy in the business of mining, some of the companies operating on this coast have sought to compass this end through a reduction of the wages paid their workmen. It is not in this item of expenditure that reform is called for. The men who delve in our mines are not as a general thing over-paid. It is true, their wages in the interior districts seem high. But, everything considered, they are not excessive. Traveling to and from these remote localities is costly. Living there is expensive, and very rarely does the miner get steady employment. He usually works by the day and may at any moment be discharged, and once out of a place it may be a long time before he gets another.

Again, this vocation besides being uncertain and laborious is a dangerous one, and it is only just that they who follow it should be paid for this extra peril. In the course of time a large proportion of all underground miners lose their lives or get so crippled and maimed that they can no longer follow their calling or even earn a livelihood at anything else. The loss of eyesight or of an arm or a leg is a thing of frequent occurrence with those who survive the terrible accidents of the mine. Only a few days since nearly 200 workmen were instantly killed by an explosion in an English colliery, and scarcely a day passes but some of these hardy men are killed or fearfully mangled in the mines on this coast, these accidents sometimes being the result of the criminal carelessness or the sordid parsimony of Superintendents or other agents of their employers. Surely something should be allowed these men for this increased percentage of danger so incident to this business.

It is thought by persons unacquainted with the requirements of the occupation that almost any strong, able-bodied man is capable of making a good subterranean miner. This is a mistake. A man may possess the necessary strength and other corporeal qualifications, and yet lack the mental powers and aptitudes, without which he is unfit for the business. To go down and toil in the deep, dark chambers of the mine requires nerve, courage and a capacity for endurance that few men possess. There are thousands who above ground could face any amount of danger undaunted that in the heated and suffocating atmosphere of the mining pit would faint and give up or perhaps fall a victim to their fears on the slightest mishap. There are men who could creditably head a forlorn hope or desperately charge in battle, who could not climb the tall ladders nor descend the deep shafts of a mine without quailing. For engaging in a pursuit so injurious to health and so perilous to life the miner's remuneration is little enough. How poorly would the most of us feel compensated with his pay for going down into the gloomy and appalling abyss, and there inhaling the deadly gases, exposed to destructive explosives, toiling daily and nightly as he is forced to do. To work under such hard conditions, with death impending on every hand, should certainly entitle the laborer to an additional dollar or two per day.

And worse still than this cutting down of the miners' wages to starvation prices is the practice to which some companies have had recourse of substituting Mongolians for white laborers where the latter have declined to accept the reduced wages proffered them. This is a matter of general concernment. It reaches beyond its bearing on the pecuniary interests of a mining company. Our miners as a class are noted for many fine moral qualities as well as great bodily perfection. They are the best developed portion of our population. Many of them would serve well as models for the sculptor. This is something in an age distinguished for its physical degeneracy. Then, too, familiarity with danger has, as usually happens, tended to make them brave, generous and self-sacrificing. No class of the community give more freely for the relief of the destitute and suffering, nor do any more readily imperil their lives in the cause of humanity than they. No one can read of the magnanimity and bravery displayed by these miners on the occasion of the late calamity in the Gould & Curry without being deeply impressed with their intrepidity and genuine nobleness of character. Nor is this an isolated case. On all similar occurrences they have shown a like self-abnegation and disregard of danger in their almost reckless efforts to rescue their companions from the jaws of death. This is a heroism in the best sense of the term. This is courage of the loftiest kind, and we cannot afford to have men like these supplanted. As a people we cannot consent to the destruction of a school that nurtures these noble qualities and trains up men to the practice of the more exalted virtues, even though it slightly diminish the cost of hillion production and add to the net earnings of mining incorporations. Lessened expenditure and increased dividends are altogether desirable, but they must not be reached through the sacrifice of the public good and the extinction of the most manly and most needed element of modern society. Retrenchment in mining must be effected through some other method than the curtailment of wages or the substitution of Chinese for Caucasian labor.

Notes on Amador County.—No. 3.

[From our Traveling Correspondent.]

Fiddletown and Vicinity.

The mining interest in and about this place has been neglected, or rather prospecting has not been prosecuted with that energy which has characterized other portions of the county. In fact, but little prospecting has been done since placer mining ceased to be profitable, the old miners, many of whom remain here still, preferring to turn their attention to other pursuits, or to hunt for quartz, deep gravel deposits, etc. The creeks and gulches hereabouts were exceedingly rich, and wherever quartz has been found and prospected, it has shown well in gold, but explorations here have not exceeded 100 feet in depth, although quartz indications and croppings are easily traced for long distances on the surface.

This town is located on the eastern mineral belt that runs through the county parallel with the great mother lode, and about seven miles distant from it. This belt is not so wide or well defined as the mother lode, but where it has been explored, as at Volcano, it has been found to carry small, rich veins and pockets, but nowhere has it been sufficiently prospected to determine its extent or value.

A Sulphuret Mine.

At a point eight miles northeast of Fiddletown, has been found and partially opened a very extraordinary mineral deposit. It consists of a fissure in the solid granite eight feet wide, with smooth walls and a slightly easterly inclination. This crevice is filled with a soft bluish mud that can be shoveled out with but little picking. This mud contains gold sufficient to pay for washing; also a very large percentage of sulphurets and float quartz. Some of these sulphurets are crystallized in octagons as large as a hen's egg, with sides and angles perfectly true, and occasionally one bespangled with small specks of gold. These sulphurets yield, by chlorination, \$25 to \$35 per ton. This mine has been opened to a depth of 100 feet. It is called Hite's sulphuret mine, and is owned by J. H. Young; Judge Purrington, of Fiddletown, has the extension and proposes to put up working machinery.

American Flat Mine and Ditch Company. This company has just put in 3,480 feet of tail flume, two and a half feet in the clear, through which they are hydraulicing the tailings from American Flat that were run in from Slate creek. This body of tailings is about 20 feet deep, and it will require at least two years to wash up. They use here 800 inches of water under 250 feet pressure. A partial clean-up of 20 boxes yielded \$1,300, a result satisfactory to the owners. The gold is of a good quality, assaying at the mint \$55 fine. Water for washing is supplied by the Parrington ditch, one of the best water rights in the county, its source being the Middle Fork of the Cosumnes river. This property, managed by Mr. A. H. Harris, is situated one and a half miles south of Fiddletown.

Volcano.

This town was well named, being situated in a deep basin washed out by Sutter creek, though having the appearance of an old crater or bed of a lake. Powerful dynamic forces have evidently been at work here, the vicinage presenting an interesting field for the study of geology. Volcanic, diluvial, glacial and earthquake agencies have all left traces of their action in the tall hills, deep ravines and lava flows of this neighborhood. The rich alluvial soil, resulting from the attrition of these warring forces and the more genial influences of the atmosphere and sun, holds the gold that at first so richly rewarded the labors of the miner and produces the abundant crops of grain and the luscious fruits that bless the farmer and the orchardist. The placer mines here have been fabulously rich, it being estimated that \$25,000,000 have been taken from this small basin. Mining and prospecting has been much neglected since the surface placers were exhausted, until the last year, when a little life was infused into this lethargic population by a few enterprising men, who have undertaken to develop some of the untouched mineral resources of this extraordinary locality. First in order is

The Consolidated Amador Hydraulic Gold Mining and Land Company,

Superintended by L. McLaine, and owned principally by Charles McLaughlin, of San Francisco. This property is situated one and a half miles south of Volcano, on the road to Jackson, at a place called Grass Valley creek, or Pleasant valley, and contains 540 acres, all, or nearly all, a gold-carrying gravel bed, varying in thickness from four to 40 feet. They are now putting in a flume, 7,165 feet in length and three feet square, to run the gravel through. This is a work of no small cost, as a cut through the rim-rock had to be blasted to a great depth to get sufficient fall. The grade of flume will be three inches to a box of 14 feet, which is thought sufficient, as there are no heavy boulders to be run off. Six hundred inches of water, under a pressure of 250 feet, and one giant will be used. The ground has been thoroughly prospected by shafts at different places and found to be uniformly rich in coarse gold on the bedrock. The land cost \$32,000, which, with the cost of improvements,

Government patent, etc., will bring the whole up to a round sum. The company is incorporated in San Francisco. Adjoining this property is the claim of

Louis Loudekens,

On the same creek, containing eight acres, also patented, which has been prospected by shafts and yields largely. Mr. Loudekens has been staying by this little nest egg for years and is now about to be rewarded for his patience. He will work his mine through the outlet of the Amador company.

The Volcano Gold Gravel Mining Company, Superintended by George Muck, and owned mostly in Santa Cruz, are running a tunnel into the Volcano Basin, to tap the gravel bed on which the town stands, 42 feet deeper than it has been heretofore worked. This basin could not heretofore be bottomed, owing to the great amount of water met with. This tunnel, which will drain it, will be 2,000 feet long and cost \$65,000. One thousand feet has been run and the remaining 1,000 feet will be finished in about 10 months. It will drain several hundred acres of mining land and undoubtedly make available a large amount of hidden treasure.

Many Mines.

From Mr. Robt. Stewart, who has been an assayer here for many years, I glean the following facts with regard to many mines just being opened in this vicinity. Mr. Stewart is repairing the old 10-stamp Fogus mill, which has lain idle for many years. It is driven by water power and will be in running order in a few days. He will commence milling the ore from the Robinson mine, in which there has just been opened a three-foot ledge, yielding ore that will mill \$50 per ton. He will also work ore from the Downs mine, situated one and a half miles from Volcano. This is an old mine, long since abandoned but recently reopened by Mr. Downs. The ledge is from two to three feet wide and the ore will mill from \$50 to \$100 per ton, much of it assaying still higher. They have some 200 tons on the dump, ready for the mill when completed.

Other Mines.

In the same neighborhood is the Golden Gate, the Confidence, David Robinson, the Rogers & Epling, with 10-stamp mill, and the old Markley mine, all showing good pay ore, with veins averaging from two to four feet in width. On Pioneer creek, about five miles from Volcano, is the Griesbach mine, which has been worked about two years and yielding handsomely. Adjoining this is the old Pioneer mine, the Belding, the McCreevey and several others, all of which enjoy a good local reputation.

Pine Grove.

Near Volcano, is a pleasant little mining camp, with some good hydraulic mines near by, that are yielding very well. Judging from some prospects recently obtained by Mr. J. T. Wheeler, merchant of that place, the placer deposits about Pine Grove are far from being exhausted, if indeed they have all yet been found.

W. G. A.

Jackson, June 19th, 1878.

Mining in El Dorado County.

[From our Traveling Correspondent.]

The Old Pacific,

Now known as the Placerville gold quartz mine, is just now the center of most interest about Placerville. It is located within the limits of the town, on the serpentine belt, or what is usually denominated the "mother lode." Discovered in 1853, it was worked continually until 1862, during which time it is represented to have yielded not less than \$400,000. From that date to this but little work has been done upon it with the exception of sinking a vertical shaft, east of the vein to the depth of about 300 feet. It has recently passed into the hands of English capitalists, who propose to thoroughly test its merits. Mr. J. B. Thomas, the present Superintendent, took charge about a month ago, since which the water has been pumped out, the obstructions cleared away, the mine wholly or partially retimbered, and connection made from shaft above referred to with the old works. The result of the late explorations are more than satisfactory. The ledge is said to be fully four feet in width, and the assays from the quartz, taken in connection with the many fine gold specimens in sight, would indicate that the mine under the new dispensation is not likely to lose much of its old reputation for richness.

Immediately west of the Pacific and the serpentine belt is a slate formation varying in width from 250 to 400 feet, and extending north and south from the Cosumnes river to the middle fork of the American. Along the line of this slate belt a large number of promising mines are located, among them the Oregon, Epley, Church Union, Gross and

The Rose,

Which last is understood to be owned and managed by Mr. C. W. Brewster (an intelligent business man of Placerville), and as far as developed gives promise of a bright future. The hoisting works, situated about 500 feet from the Pacific shaft, were completed in April last, at which time also the work of further sinking was resumed on a shaft commenced in 1874. The motive power is water, conducted in iron pipes 3,200 feet in length from the canal of the El Dorado W. D. G. M. Co., at an elevation of

280 feet, eight inches, supplying ample power for hoisting both water and rock from a depth of 150 feet. The ore is a *fac simile* of that extracted from the Amador county mines. As far as tested it has given excellent results, 300 tons taken out soon after the commencement of operations averaging \$46 per ton.

The Gross Mine,

The property of Messrs. Gross & Moen, two miles north of Placerville, has been opened to the depth of 130 feet. The new tunnel, soon to tap the ledge, will strike it 250 feet deeper. In width it varies from 18 inches to eight feet, and in the widest parts averages \$8 per ton, the quartz from a pay chute going upwards of \$100. The mine besides furnishing a livelihood for its owners, has paid for developments and improvements, all of which may be attributed to good judgment and prudent management.

The Keegau mine, bonded to J. Blair & Co., has been opened by two tunnels, respectively 110 and 115 feet along the ledge, the greatest depth reached being about 75 feet, and width of lode at bottom of the connecting shaft, three feet. A test of 90 tons as it came from the mine gave a gross yield of \$23.50. Having secured an extension of the bond, the above parties are about to proceed vigorously with the work. The same gentlemen own the old American, a north extension, from which about \$40,000 is represented to have been taken out within the past few years.

The Sandstone Lode,

Lying east of the serpentine belt, owned and worked by Messrs. Pearce & Kennedy, seems to be a *lusus nature* in quartz formation. In many thousands of miles of travel through the mineral regions of the coast, I have met with nothing of the kind before. The fissure is about four feet wide and can be traced a long distance, walled on each side by the tilted slate. Small quartz seams from two to four inches wide and from two to four feet apart, cross the fissure at nearly right angles, pitching north and west at an angle of about 45°—the fissure running north and sides nearly perpendicular—while smaller seams, forming a kind of joint, pitch south, cutting the former at right angles. The gold is found in pockets and generally where the seams come in contact with one of the walls, or at the conjunction of crossing seams of quartz. The mine has thus far paid fair wages.

Other Mines.

The New York, in the same vicinity, is about 10 feet in width, the gangue consisting of talcose slate and quartz. Seventy tons recently worked yielded at the rate of \$15 per ton. The Griffith Consolidated, at Diamond Springs, situated on or near the serpentine, is said to be from four to six feet in width. Some of the rock taken from the depth of 75 feet, the past winter, milled from \$20 to \$30 per ton. It contains from 3% to 4% of sulphurets, estimated at from \$100 to \$150 per ton. It is expected that operations will soon be resumed here.

The Springfield Mining Company

Are working what was formerly known as the Church Union mine, situated a few miles southeast of El Dorado. It is under the superintendence of Mr. S. R. Poundstone, and it has reached a depth of 550 feet, at which point it shows a ledge of undoubted merit. The 10-stamp mill of the company has been running steadily since last April, the rock averaging about \$20 per ton, while the prospects of the mine for the future are represented as particularly encouraging.

The Davidson quartz mill and mine have been leased to Mr. H. H. McClellen, of San Francisco, for one year, with privilege of purchasing. The work of hauling out the water has commenced. The formation and character of the rock speak favorably for it as a mine.

Messrs. Stackslager & Plumtree, at Uniontown, have a small quartz vein from six inches to two feet between the granite and slate that has recently paid remarkably well, panning out upwards of \$15,000 with a couple of months. The gangue, carrying the most gold, possesses peculiarities worthy the attention of the mineralist. A specimen for examination will be forwarded by first opportunity.

The drift and hydraulic mines of the county are paying about as usual, but little change having taken place within the past two years. Some new ground has been broken at Badger hill that prospects to the full satisfaction of miners best posted. Hoisting works have been put up and a mill will soon be erected.

The Cedarville water and gravel mine, at Indian Diggings, the property of Messrs. Chas. E. McLane & W. T. Henson, after a heavy outlay, is now beginning to pay expenses. They hope to take out \$1,000 per day as soon as the main bed of gravel is reached. The face is 130 feet in height, and the gravel prospects 75 cents to the cubic yard.

A. C. K.

Placerville, June 23d, 1878.

INVESTMENTS IN MINES.—The shrewdest and most sagacious business men in this country, to-day recognize the fact that mining investments, prudently entered into, are the safest and most profitable that capitalists can make, and they admit that "mining" will be the next "sensation" in financial matters. The very facility which mining investments is giving for floating unsound or dishonest schemes, makes it all the more necessary that prudent men should carefully investigate the claims and merits of any enterprises offered them before parting with their money.—*Engineering and Mining Journal.*

MECHANICAL PROGRESS.

An Imperial Street Car.

Dom Pedro, Emperor of Brazil, is having a street car built for his own use, in New York city. The *American Manufacturer* says it is somewhat larger than the ordinary car in use here, and is finished in ash, basswood, plain and curled cherry, and plain and bird's-eye maple. The roof is of the perforated wood now in common use, allowing impure air to escape when the ventilators are closed. The exterior is painted in the national Brazilian colors—green and gold—the upright pillars of lake, with gold line ornamentation, and the lower woodwork a delicate cream green.

The word "special" in large letters is upon the outside. The Brazilian arms occupy the middle panels on either side, and sketches of Brazilian and North American scenery fill the remaining panels. In each side are five plate glass windows, the center one four feet six inches wide by two feet eight inches high, the others 11 inches in width by the same height. All the metal work is nickel plated. A large central lamp lights the car at night. A sofa, two chairs and a center table in the Eastlake style comprise the furniture. The interior panels are also decorated with landscapes. Lambrequins of dark blue stamped leather, with black velvet borders, studded with brass nails and with a fringe of woolen tassels, are over the windows.

In the doors are set large mirrors, and small ones fill the space between the windows. The floor will be carpeted with Axminster. The platforms are protected by wire grates, and a life-guard prevents persons from getting under the wheels. The car will be used to convey the Emperor from his country house to his executive palace in Rio de Janeiro. It will occupy the court of his palace when not in use, and when required will be switched upon the track of the Botanical Garden railroad company.

AUTOMATIC CYCLOMETER.—Contrivances for registering the revolutions of machinery are numberless, and new modifications are continually being devised. The principle of nearly all is the very simple one upon which the record of a gas meter depends, and this is, perhaps, the best, being the least intricate. *Iron* describes a cyclometer, and especially adapted for bicycles and carriages, a larger form of it being made for machinery. The peculiar feature of this is, that the case revolves, leaving the inner mechanism and face to remain in one position, where it is retained by a weight in its lower part. The revolution of the case drives, by means of a center pinion, the toothed wheels which move the indexes, and thus a register is secured. For carriages, cabs, and omnibuses the case forms a cap at the end of the axle, every revolution of which is recorded, and the dial indicates either the number of revolutions, or, by a different graduation, the actual distance traversed in miles and yards. For bicycles, the cyclometer is clamped on the axle inside the spokes of the driving wheel, and it is marked to register revolutions only, a table being furnished to convert these into distances, according to the diameter of the wheel driven. The same instrument is thus applicable to various-sized bicycles. An advantage of this form of indicator is that its hermetic sealing is perfectly easy, and in fact almost necessary, so that the chance of introduction of dust and wet is reduced to a minimum. In the case of machinery—say a printing machine—the cyclometer is screwed on the end of one of the impression cylinder, and there does its work as satisfactorily as in the other capacities we have mentioned.

THE CARE OF BRIDGES.—The following statements and suggestions are contained in the report of Mr. C. E. Williams, C. E., State Inspector of Bridges, to the Ohio Railroad Commissioner, and taken from advance sheets of the Commissioner's report for 1877: As a rule, the bridge men look after their structures closely, but in some cases have been negligent—bridges were found out of adjustment, and in some wooden bridges the main braces were almost off from the chords. In other cases there was too much adjusting; the structures were in danger of being pulled to pieces and the life of the bridge shortened. When a nut is rusted so that it is fixed and will not turn, it does not follow that this member is in proper tension, nor, if the nut turns easily, that it must be turned so long as it can be moved. It requires constant care, judgment and a knowledge of strains upon the structure, to adjust and keep a bridge in proper condition, and there is no certainty of it so remaining for six consecutive weeks after a careful inspection. Iron bridges should be so constructed that every part can be reached and covered with a heavy coat of paint suitable for the purpose. There are portions of a bridge where one-sixteenth of an inch taken off from each side of the web each year, by rust, will very soon render the parts worthless. On new wooden bridges, with heavy timbers not well seasoned, paint should be used with caution, applying at first but a light coat, merely sufficient to prevent the absorption of moisture, not so heavy as to hermetically seal the timber and cause it to take the dry rot from the inclosed sap.

Machine for Cleaning Ships' Bottoms.

We read that a firm of shippers in Glasgow have patented a hydraulic cleaner for ships' bottoms, which is well spoken of. The apparatus consists of a small portable hydraulic machine and keel-catcher. On the machine is placed a rotating brush, which is put in motion by a turbine. A canvas hose connects the turbine with a hand or donkey pump. The keel-catcher will travel and retain its hold on any curved stem or straight keel by means of conically-shaped india-rubber rollers, which are moved either forward or aft by means of an endless rope from the deck. In commencing the operation, the keel-catcher is adjusted to the stem of the vessel, above the water-line, and lowered by the pulling of the endless rope. The machine, moved toward the keel by the rope passing through the keel-catcher, will, owing to the updrift buoyancy, press the revolving brush against the ship's side, whatever its shape, and clean it effectually. When the machine is felt to have reached the keel, the rope attached to its tail pulls it upward. After it has reached the water-line the operation is repeated, the keel-catcher and pulling ropes being shifted the length of the brush nearer the stern, so that a fresh strip of the hull is cleaned. The machine works up and down in this way, until it reaches the stern, and when one side of the vessel is cleaned the machine is attached to the other side and worked as before. The bottom of the Allan steamer *Corinthian* was cleaned in this way as she was coming up the river, and an inspection after she had reached the gearing dock showed that it had accomplished the object perfectly.

PNEUMATIC GRAIN ELEVATOR.—The *Revue Industrielle* gives a description of a new pneumatic grain elevator, constructed by Renhay. It consists of a centrifugal ventilator, the suction pipe of which is carried to a receiver placed upon the level to which the grain is to be carried. From the same receiver the supply pipe runs to the place from where the grain is to be lifted. Between the openings of the suction and the supply pipe of the receiver is an inclined plane, which throws the grain downward. A screen prevents the grain from entering the suction pipe, through which only the dust is carried off. A piston regulator at the lower end of the supply pipe acts in such a manner upon an adjustable nozzle that the proper proportion between the amount of air and grain admitted is automatically maintained. The principle upon which this pneumatic elevator acts is that when solid particles in movement in a pipe are mixed with air, a semi-fluid is formed in which the pressures vary in accordance to the laws governing ordinary fluids.

SPECIFIC GRAVITY OF BESSEMER STEEL.—In the *Chemical News*, Sergius Kern, the author, describes some experiments made with the Bessemer metal, samples of which were obtained from the retort just before the addition of the spiegelisen. As it was of some interest to know the specific gravity of such a metal in the forged state, a specimen was hammered under a steam-hammer, and from the bar four pieces were cut and polished in order to examine the specific gravity, which was found to be at 16°C.:

Samples.	Specific Gravity.
Outside part: I.....	7.4821
II.....	7.4902
Inside part: III.....	7.5009
IV.....	7.4938

The fact that such a specimen of Bessemer steel has such a low specific gravity, even in a hammered state, may be explained by the porosity and great difficulty in forging such a metal, which, in the melted state, was not freed from the oxides of iron by the addition of a convenient quantity of spiegelisen.

GERMAN WORKSHOPS.—A few years ago Germany bought a great proportion of her naval materials and stores in England. But of late she has been able to draw on home sources of supply. The heaviest iron plates are now manufactured at the Dillingen works; engines of all sizes are turned out by the Egell Company at Berlin, the Vulcan Company at Stettin, and the Weser Company at Bremen; anchors are made by Hensell & Lueg and the Gute Hoffnung Company; anchor cables by Vinske & Blatt and the Duisburg company; wrought iron blocks and articles by Messrs. Borsig at Berlin, and Krupp at Essen. Government dockyards and private establishments are building men-of-war of all sizes, including the largest, with all the latest improvements demanded by modern science. Westphalian coal is, it appears, exclusively employed on board their men-of-war.

STEAM ROAD WAGONS.—In 1877 the Wisconsin Legislature passed a bill offering a bounty of \$10,000, for the best practical steam road wagon, and lately a commission of two farmers and one engineer was appointed by the Governor to pass upon the inventions submitted. The day fixed upon for that purpose was June 10th, and some half-a-dozen machines were entered for competition. As a test, each wagon was required to carry a heavy load over an ordinary country road for 200 miles, at the rate of five miles per hour. The result is not yet announced.

SCIENTIFIC PROGRESS.

What is the Function of Chlorophyll?

This and other questions are discussed by Sydney H. Vines, in a recent address on "The Chemical Aspects of Vegetable Physiology," before the English Chemical Society. As regards the composition of chlorophyll, we have but little information. There are at present several distinct views as to its proximate composition: one that it is a definite and distinct chemical entity; the second, that it is a mere mixture of coloring matters, or rather of two groups of coloring matters, one group being blue, and to which the name cyanophyll is applied; the other yellow, and termed xanthophyll. Another view, supported by Pringsheim, Karl Kraus, etc., holds that chlorophyll is nothing less than the cyanophyll of other observers, while the xanthophyll is a distinct substance, which is a product of the degradation or formation of chlorophyll, but forms no integral part of it. The same diversity of evidence prevails with the ultimate constitution of chlorophyll. According to Pfander, it contains 0.37% N; other results give 7%; whilst a Russian observer, Timiriazoff, believes it to be an ammoniacal compound, and has called it chlorophyllin. One point seems to be agreed upon by all observers, viz., that it contains iron in its molecule. The opinions which prevail as to the action are various. Wiesner thinks that the growing cells absorb CO₂ from the air, that the chlorophyll combines with the O, while CO unites with the elements of water to form carbohydrates. The chlorophyll in its turn is deoxidized, and the oxygen thus set free is evolved by the plant. So that, according to this view, chlorophyll acts as a carrier. Karl Kraus suggests that the process is one of reduction, and that chlorophyll is formed by the combination of a substance, leucophyll (for whose existence there is no experimental evidence), with the products formed by the reduction of the carbonic acid absorbed from the air. The chlorophyll is then split up by the action of light into leucophyll and other bodies, the latter forming starch. The leucophyll recombines, and so the process goes on continuously. According to Sachs, chlorophyll is a product of assimilation and by the further action of light is converted into starch. By the action of purpurin or resorcin, coloring matters, more or less remotely resembling chlorophyll, have been formed. It is known, moreover, that carbohydrates can be oxidized into aldehydes and aromatic substances. From some experiments of Karl Kraus, it is probable that some substance resembling an aldehyde exists in seedlings, while Gurup Besanetz has detected pyrocatechin in plants. Some results of Karl Kraus seem to show that in seedlings an aldehyde and an aromatic substance unite in the dark to form aetioline, but in the light to form chlorophyll. So that, on the whole, there is some foundation for the theory of Sachs, which may be summed up thus: that seedlings have the power of decomposing their stored up carbohydrates, forming acids and aromatic substances. The former are reduced to aldehydes, uniting with the latter to form chlorophyll (or, in the dark, aetioline), the ultimate product being again starch. If we trace out the probable destiny of the carbohydrates, we find that one portion is used to build up the vegetable cell-wall and is there deposited as lignin, etc.; a second part combines with nitrogen to form protein—but of the seat of formation of this protein we have no idea—whilst a third portion is decomposed into chlorophyll for the newly-formed parts of the plant. If any excess remains, it seems to be stored up for another year.

Farther Liquefaction of the Gases.

Since the liquefaction of oxygen, the chemists have pushed the process farther and have drawn down other aeriform substances. According to a review in the *American Journal of Science*, it appears that Cailletet, studying the compressibility of acetylene, observed a marked departure from the law of Mariotte in its behavior, and, pushing the condensation still further, succeeded in liquefying it. The apparatus consisted of a hollow steel cylinder, thick enough to resist a pressure of several hundred atmospheres, having screwed into it at the top a bronze collar carrying a thick glass reservoir closed above, and continued downward by a larger tube, open at the bottom. This glass tube contains the gas to be liquefied, its lower end dipping below the surface of mercury up into the tube, compressing the gas and finally liquefying it in the narrow portion at the top. In compressing acetylene, the temperature being +18°, numerous droplets are seen to form and run down the walls of the tube, under a pressure of 83 atmospheres. Reducing the pressure gradually, the liquid returns suddenly to gas, filling the tube for an instant with a thick fog. Liquid acetylene is colorless and extremely mobile; it appears to be highly refractive, and is lighter than water in which it is soluble in all proportions. It dissolves paraffine and fats. Cooled to zero in presence of water and linseed oil, it forms a white compound like snow, which decomposes on heating or lowering the pressure. The tension of the acetylene vapor is as follows: at +1°, 48 atmospheres; at 2.5°, 50; at 10°, 63; at 18°, 83; at 25°, 94; at 31°, 103. Comparing the tensions of acetylene, ethylene,

and ethylene hydride (C₂H₆) which contain in equal volumes, equal weights of carbon united to increasing quantities of hydrogen in the ratio 1, 2, 3, the author finds the tension of acetylene at 1°, as above, to be 44 atmospheres; that of ethylene at 0°, according to Faraday, being 46 atmospheres, and that of ethylene hydride—now liquefied for the first time by Cailletet—at 4°, being 46 atmospheres, its liquefaction taking place at a pressure a little less than that of acetylene. In a subsequent paper, Cailletet announces the liquefaction of nitrogen dioxide, by a pressure of 104 atmospheres at -11°. At 8°, the dioxide is still gaseous under a pressure of 270 atmospheres. Marsh gas, compressed by 180 atmospheres at 7°, shows, when the pressure is suddenly diminished, a thick fog like that given by carbon dioxide under similar circumstances; whence the author hopes to effect its liquefaction.

THE INTERNATIONAL GEOLOGICAL CONGRESS. Prof. T. Sterry Hunt announces that the time for the opening of this congress in Paris is now finally fixed, by the local committee, for the 29th of August, and the congress will remain in session about a fortnight. Further details as to organization and place of meeting will soon be made public. Meanwhile, it is announced that from the 20th of August to the 15th of September, the library and reading rooms of the Geological Society of France, No. 7 rue des Grands-Augustins, Paris, will be at the service of members of the congress. As before, it is requested that all those who desire to take part therein will make it known to the General Secretary, Dr. Ed. Jannetaz, at the above address, where, also, the subscription of 12 francs, required for each member, may be sent to Dr. Bioche, Treasurer. Ladies are admitted to the congress. The local committee add to the above announcement as follows: There is reason to believe that the numerous collections of geology and paleontology (minerals, rocks, fossils, maps, plans, sections, models in relief, etc.) to be found in the Universal exposition, will realize the expectations, expressed in the circular of the International committee, of an International Geological exhibition. All exhibitors of such collections are requested to send, as above, such lists as will enable the General Secretary, Dr. Jannetaz, to prepare a special catalogue of them for the use of the congress.

TEST OF WOODY FIBER.—According to the *Journal of the Franklin Institute*, Dr. Wiesner recommends phloroglucin as an extraordinarily delicate reagent for woody fiber. Place a drop of a half per cent solution of phloroglucin upon a bit of pine, and moisten the spot with a drop of hydrochloric acid, and there immediately appears a beautiful lively red stain, verging upon violet. On drying, the violet tinge becomes still more marked. Even if the solution contains only one-hundredth of 1% of phloroglucin the red color is very decided; and if there is not more than one-thousandth of 1% the reaction can be recognized under proper precautions. If a strip of pine is allowed to remain in such a solution for 24 hours, hydrochloric acid gradually draws out a perceptibly reddish stain. The slightest traces of woody substance in vegetable tissues can be readily detected in this manner. The tenderest germs, by means of this reaction, show a woodiness in the cells. Every trace of woody substance in hemp and flax can be detected by the phloroglucin. Dr. Wiesner suggests that it may be used to distinguish hemp from flax, and also as a means of dyeing fabrics woven from vegetable fibers.

SPOTTED FRUIT.—*La Science pour Tous* says that M. Duchartre presented recently to the Academy of Sciences at Paris a paper by M. Prillieux on the dark spots which appear on the skin of apples and other fruits, giving the results of observations as to whether or not these and the cracking of fruits were due or not to parasitic fungi. He finds that there is "unique" proof that disease is due to the presence of a fungus, which not only penetrates the epidermis, but also the solid tissue of the fruit. The fungus attacks the leaves and branches, as well as the fruit, and thus travels by means of propagation hy drafts. And this is the chief reason why it often seems to be confined to one variety of fruit. The name of the same fungus is *Cladosporium dendriticum* of Walther. M. Duchartre pays a compliment to the address to the Pomological Association at Chicago, in 1875, by Mr. Thos. Meehan, of Philadelphia, and contends that the observations there noted correspond with the recent researches of M. Prillieux, and which prove, he says, that on both sides of the Atlantic "microscopic fungi clearly explain these morbid appearances."

A CURIOSITY.—A Tuolumne county paper says: Mr. Patrick McClosky, who is mining out his lot on Jackson street, Columbia, upon which he has resided over 25 years, a few days ago found a cast-iron ball four inches in diameter, three feet below the surface, in a natural deposit of gravel. It is much corroded, a scale one-eighth of an inch thick being formed over the entire surface, as though it had been exposed to sufficient heat to cause oxidation. No plausible theory has yet been advanced as to where it could probably have come from, and by what means it was placed in the gravel where found. In an adjoining claim, there has been found many Indian relics, such as flint arrow-heads, stone mortars, pestles, etc., in a strata of gravel underlying what is commonly termed surface gravel.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

ADVANCE.—*Chronicle*, June 22: Ore continues to be taken from this mine, and the quality is improving, and the mine generally is looking better. On Thursday, last week, fires were lighted in the furnace. Crushing continues, and leaching tubs are in preparation. One ton of ore from Mexico has been received from San Francisco at the Advance mill for treatment.

AMADOR.

PLYMOUTH.—*Ledger*, June 22: The California Boy quartz mine, owned by Evans, Briggs & Co., is looking well. A quantity of rock taken out this week was exceedingly rich, a few specimens pounded in a mortar yielded at the rate of \$100 per ton. The highest kind of a prospect is obtained by scraping the footwall after the ledge is removed. The shaft is only 20 feet deep, with a well-defined ledge and two inches of gouge. The footwall is as smooth as a billiard table. Free gold is frequently seen in the ore, which also contains considerable sulphurets and iron. It is the intention of the owners to get out sufficient rock for a crushing between this and the Fourth of July. The Chicago mine is also opening up favorably. It is down to the depth of 65 feet. Some of the rock has been crushed at the Drytown mill, but I have heard nothing reliable as to the yield.

GRAVEL MINE.—Mr. Monterichard, the discoverer of the Monterichard mine, has recently had the good fortune of finding a large and very rich gold-bearing gravel deposit, on Jackson creek, about three miles below town. He is now constructing a ditch from near the Monterichard to the claim, preparatory to working the same by hydraulic process.

THE PHENIX is paying splendidly. It is rumored that a new opening will be made upon the lode south of the present works in view of putting up 40 additional stamps.

AT SUTTER CREEK Mr. N. L. Gage is having very satisfactory results from his new chlorination works.

BUTTE.

FROM HELLTOWN.—*Record*, June 22: The Hupp claim, on Butte creek, has been cleaned up, and after 90 days work, six men per day, \$10,000 has been taken out. Quite a number of claims here have recently changed hands, and at good figures. The majority are held by companies that refuse to sell them at any price. Knowing the value of their claims they prefer to hold them. The Stryker & Maurice claim is doing well. They are taking out a good amount of gold, and are at present cleaning up. Though expenses have been heavy, it is a success. Maulhry & Co. have cleaned up, and were satisfied with the past and looked to the future for a large amount of the yellow "root of all evil." The Shephard & Co. ditch is progressing as rapidly as circumstances will permit. It is an expensive and hard job, but when completed it will place Helltown "way up." It is rich in mineral, but without water the country cannot be developed. Adams & Co. cleaned up three weeks' arrasting dirt. Three men were employed, and the amount washed out was \$2,400. Mr. Ford is getting his river claim in working shape. Last year it paid well, and no doubt this year it will be equally as good.

NEVADA.

ORIENTAL.—*Transcript*, June 24: Since June 1st have hoisted from this mine 100 tons of ore, and might have doubled the amount had they a place to put it. Work on the 350 level is being continued; both drifts are looking well. The winze on the 300 level is down 15 feet and looking well. There is no change in the character of the rock in the raise of the main tunnel.

CENTENNIAL.—Another engine has been put up on the Centennial mine, on Osborn hill, which gives sufficient power to work deeper than heretofore. Sinking the incline for another level has been in progress for some days. Another crushing of rock, amounting to 60 loads, is being hauled to the Orleans mill. It promises to yield as well as previous crushings.

WATT BLUE GRAVEL.—The drift is in 330 feet from the shaft, with no change in the gravel. Will continue drifting until they get a favorable place to sink a winze. The machinery is working smoothly.

A NEW VENTURE.—Mr. Thos. L. Hughes, who lives on the Rough and Ready road, about two miles southwest of town, is prospecting in the ridge near his dwelling house, for gravel. He has put up hoisting works, and is sinking a perpendicular shaft. The shaft is down 150 feet, and the appearances indicate that there is a true channel there, and that it will soon be reached.

PLACER.

HUNT'S HILL.—*Forum*, June 19: The McAllis company are driving a bedrock tunnel, 800 feet in length, of which 560 are completed. This tunnel, when finished, will bring them about 25 feet lower at the head. The ground is known to be immensely rich and will reward them handsomely for the outlay, while other improvements included amounts to a good many thousand dollars. The Turner claim has been shut down after a successful season. The McCleod claim, recently sold to a San Francisco

company, for \$35,000, is well situated, having the natural outlet for the whole hill. They have put a very expensive rig on the claim—1,500 feet of pipe, furnished by Mr. Hoskin, of Dutch Flat, made and laid under the supervision of Mr. Boeck, which cannot be surpassed in workmanship and skill in this State. The flumes and undercurrents, under the management of Mr. King, are fine, substantial pieces of work and are a credit to that gentleman. The reservoir, under the charge of E. Boho, of Nevada City, is as fine a piece of work of the kind as there is in the county.

THE DIVIDE.—A note from Michigan Bluff informs us that business on the Forest Hill Divide is good and getting better. That part of the county is coming up. The mining season has been more than usually encouraging. Some new developments have been made and others are promised. The towns are all lively and the people generally happy.

PLUMAS.

JACKASS QUARTZ MINE.—*National*, June 22: The shaft here is down 40 feet, at which depth the ledge shows well, about five feet of clear quartz with good walls and has every appearance of a true vein. Many pieces of the rock show fine gold and the hand-mortal and horn bring out surprising prospects. The quartz has a healthy appearance and shows better by far than anything in that line we have seen on this side of the Indian valley ridge. They are taking out 100 tons of rock to be crushed in the Bell mill, and if it does not show a clean-up worth telling about, we shall miss our guess. The ledge can be easily traced for hundreds of feet, and a look over the ground will convince any quartz miner that the property is a valuable one, and that a permanent and, what is better, a paying mine is sure to be opened.

RICH GULCH.—Captain Corser says things are flourishing on the river. His late clean-up shows that he has made an ounce per day during the water season, besides prospecting a body of gravel which is sure to give him rich returns in the future. The Rush Creek Flat boys are again on the lead and taking out big pay. Hyde is doing well and the Hallsted claims paying as usual. The water has commenced to "let up," but the season will show good average results.

HEAD OF NELSON.—We learn from Senor M. Nunes that the prospects for the miners on Nelson and Hopkins creeks were never better. There are more men at work in that locality than at any time before for years, and most of them are doing well. There is lots of snow in that country yet and there will be an abundance of water till late in the fall.

THE CASCADE gravel company, on Grizzly mountain, have opened a splendid bank of gravel, having a face of 100 feet now, with the bedrock pitching into the hill. The company have an abundance of water and are using about 400 inches. The water will last until late in August, if not longer.

STRUCK GRAVEL.—The Bell Bar blue gravel company have struck a good lead of paying gravel in their claims in the middle fork. They have been prospecting for a long time at considerable expense and have recently put new machinery on the ground and prepared for extensive operations. Their success will encourage others and before long there will be a number of good claims developed on the Blue lead in Plumas county.

MORE QUARTZ.—H. Smith and R. Bell are sinking an incline on a ledge a short distance above Bushman's Black Hawk claims. They are getting some fine prospects and think they have got a permanent good thing. There is evidently a fine showing of good quartz in that locality.

SISKIYOU.

THE LUCKY BALDWIN.—*Yreka Union*, June 22: On Saturday last the water increased so in this mine that the one 10-inch pump at work could no more than keep it even, so the work of sinking the shaft was stopped and preparations made to put in another pump at once. The carpenters have built the frames and beams necessary and the pump was put into position on Wednesday. The additional pump is also a 10-inch and it is expected that the two will have no trouble in keeping down the water. If, however, they should fail to keep out the water, the company have two other large pumps, one of 10-inch and one of six-inch capacity, ready to be put in. The pumps were started up yesterday morning and the work of sinking the shaft resumed.

THE MINES.—the numerous placer and quartz mining enterprises commenced in this county this spring, has greatly improved our business interests, and if they only turn out successfully, there will be no place on the coast more prosperous than Siskiyou county.

SIERRA.

MINING ITEMS.—*Mountain Messenger*, June 22: The Highland Mary mining company, whose works are situated at Wahoo, near Port Wiue, is about ready to raise up to tap the gravel channel, under which they are supposed to be. A contract will soon be let for a short piece of tunnel, and when that is completed, a shaft will be raised. It is the universal belief that a fine channel will be tapped. The Pioche mine is again having trouble with water. The large pump will soon be in place, when it is to be hoped no further trouble will be experienced. The Brush Creek mine still holds its own, the ledge being 12 feet wide. The mill is now running on good rock.

TUOLUMNE.

THE SOULSEY Co.—*Independent*, June 22:

This company, under the management of Mr. John Lecchman, are substituting water for steam power. Five hurdy-gurdy wheels are being placed in position, and will no doubt materially lessen the cost of running. Seventy-five men have been employed in and about the mine, but 15 of this number have recently been discharged for want of work to keep them employed.

WORKING AGAIN.—The Milton mine, near Tuttletown, owned by a San Francisco company, began working again yesterday week. Mr. Selleck, Superintendent, informs us that he intends sinking at least 400 feet, gold or no gold, to test the claim. The shaft is down 17 feet, with a two-foot vein. This is the mine worked before on the strength of a divining rod or gold indicator.

THE GOLDEN GATE.—The hoisting works at this mine are being erected, and ditches are being cut to convey water to the mine, which is now furnished by the Tuolumne Water Co. through the new pipe at the southeast end of town. The works will be erected in the tunnel, and the water to run them will be conveyed in a pipe down the shaft.

Nevada.

WASHOE DISTRICT.

CALIFORNIA.—*Gold Hill News*, June 26: There is no change in any of the ore-producing sections of the mine. Sinking the C. & C. shaft is making fair progress, the bottom still in hard blasting rock and the flow of water strong. It is now down 44 feet below the 1950 station. There is no change of value to report of the work on either the 1500 or 1600 levels. Retimbering the Consolidated shaft is being pushed ahead with all the speed possible, the heat being so intense it being almost impossible for the workmen to endure it for even a few minutes at a time. Double shifts of men are employed and every effort used to give the men all the air possible, and still the heat is so great that they cannot endure it for more than a few minutes at a time. This necessarily makes this portion of the work very slow and greatly impedes the extraction of ore and the advance of the prospecting works on the lower levels.

CON. VIRGINIA.—There is no change in any of the ore stopes on the 1200, 1650 or 1750 levels, although much difficulty has been experienced in prosecuting the work on all the lower levels of the mine during the week on account of the great heat. The winze in the ore body on the 1650 level has completed a connection with the west crosscut from winze No. 1, the entire depth continuing in ore of a good quality. Another winze in the ore body below this level has been started 70 feet further to the southward, the bottom of which, at a depth of 17 feet, still continues in splendid ore. The north drift from No. 2 winze on the 1750 level still continues in good ore. The north drift from No. 3 winze on this level is steadily advancing, the face in low-grade ore.

CON. IMPERIAL.—West crosscut No. 1 from the main north and south lateral drift on the 2400 level is still advancing in a fine character of vein material, the face showing more quartz than at any time since the drift was started. The face of west crosscut No. 2 on the same level is in ground of much the same description.

SAVAGE.—The water in the main incline is down to a point 58 feet below the 2100 station. The east drift and the Suto tunnel on the 1640 level are so close together that the loading and running away of the cars from the face of the header in the tunnel can be distinctly heard. There is not much doubt now that this important connection will be completed by or before the 4th of July next. On account of an insufficiency of air to drive the north lateral drift on the 2000 and the west drift on the 2100 levels, it was necessary during the first part of the week to suspend work in the 2000 level drift and concentrate the entire volume of air in the west crosscut on the 2100 level.

SILVER HILL.—The north drift on the 800 level is steadily advancing, the face still in favorable vein material. The south drift on the same level is also making good progress. The east crosscut, No. 3, recently started from the north drift is steadily advancing, the face in vein matter mixed with quartz.

OPHIR.—The south drift from the 2000 station of the winze sunk on the ore vein, running to connect with the bottom of the joint winze is steadily advancing in vein porphyry on the east side of the ore vein. The northeast drift on the west side of the ore vein on the 2000 level, is in a distance of 43 feet, the face in hard blasting porphyry.

YELLOW JACKET.—The north winze below the 2200 level having reached the 2400 level, a station is being cut out for a drift east at that point, and the sump is nearly completed. This new level of the Yellow Jacket is the deepest, below any initial surface line, yet attained in any mine on the Comstock. Water does not interfere, although some may be expected before the drift reaches the new shaft.

SUTO TUNNEL.—Total length of tunnel last evening 19,918 feet. The face of the header is in a good quality of Comstock vein matter—ledge porphyry and quartz with clay seams. It is now so near the heading of the Savage drift, 1640 level, that the peculiar vibrations and other noises connected with the Burleigh drilling operations in the face of the tunnel are plainly distinguishable by the Savage miners. The connection when completed will be a few feet below and a few feet north of the Savage 1640 drift.

JUSTICE.—A small amount of good ore is

being extracted, which is being shipped to the Santiago mill for reduction. The ore stopes on the 1150 level afford no change of value to report.

GOULD & CURRY.—The main incline has reached the 1900 level, at which point a station is being opened and preparations made to lower the main lift pump, so as to stop the use of the several small donkey pumps now being run with compressed air. A large blower is being erected on the 1500 level, which, when completed, will greatly assist in cooling the drifts on the 1900 level.

BELCHER.—The main east drift on the 2360 level is in 102 feet, the face in vein porphyry. The north drift on the same level, running to connect with the south drift from the Crown Point, is making steady headway, and will complete the connection in three or four days more.

BELLION.—The north drift on the 2000 level is being pushed vigorously forward, the face still in a very encouraging character of vein matter mixed with frequent stringers of healthy looking quartz. The face of the east crosscut on the 1840 level is in much softer and more favorable ground, carrying a much larger percentage of quartz than for some time past.

JULIA CON.—The main south drift on the 2000 level is being pushed steadily forward, the face in a mixture of quartz, porphyry and clay of the most favorable description. The character of the ground going south shows a steady improvement.

OVERMAN.—The east drift from the main shaft on the 1600 level is steadily advancing, the face in hard blasting porphyry. Cutting out for the 1600 station in the winze preparatory to drifting westward to connect with the east drift from the main shaft, is making good progress.

CALEDONIA.—The north drift on the 1600 level is steadily advancing, the face still in quartz mixed with clay, the flow of water being steadily increasing. The face of the main east drift on this level is still in vein porphyry.

CROWN POINT.—The main south drift from the bottom of the winze on 2300 level is being pushed ahead at the rate of eight feet per day, the face still in favorable blasting ground, and will probably complete a connection with the north drift from the Belcher some time during the coming week.

LADY WASHINGTON.—The north drift on the 1150 level is steadily advancing, the face in quartz and ore of a very encouraging look.

CHOLLAR-COMBINATION SHAFT.—It is now down 2,262 feet perpendicular. The flow of water has shown a steady increase, amounting to 53,500 gallons per day.

ALTA.—The east drift recently started on the 1450 level is now in 23 feet, the face in west country rock. The north drift on the 1350 level is in a distance of 153 feet, the face in quartz. The north drift on the 1250 level is also making good progress, following the west wall of the ore vein. It is now in 388 feet.

ALPHA.—The north drift from the 2400 station of the joint winze on the Imperial north line is steadily advancing, the face in vein porphyry mixed with quartz and clay. These streaks of quartz afford very encouraging assays. It is the intention to soon start crosscuts both east and west to determine the value of the ore vein on that level.

BEST & BELCHER.—A joint crosscut east has been started directly from the 1900 station of the winze, which is steadily advancing, the face showing some very fine quartz and streaks of low grade ore mixed with quartz and porphyry.

SIERRA NEVADA.—Sinking the main incline below the 2000 level is making steady progress, the vein matter in the bottom showing a steady and favorable improvement.

MEXICAN.—The joint east drift on the line of the Union Con., on the 1600 level, is steadily advancing, the face still in blasting porphyry. It is now in a distance of 420 feet. The main north drift will complete a connection with the old drift to-day or to-morrow.

ELY DISTRICT.

THE MINES.—*Pioche Record*, June 22: The Meadow Valley mill is now turning out so much bullion per month that it is commencing to excite considerable interest both here and below. Work on the Raymond & Ely continues as usual; very little change to note since last report. Have a good body of ore on the third level, and one between the ninth and tenth levels, which latter is not of a very high grade, but pays well. Continue to extract about 15 tons daily of fair ore. Work on portions of the compressor machinery is progressing satisfactorily. The Hillside have now 250 tons of ore on the furnace dump, and are hauling down as fast as possible. Coal is also coming in rapidly. Think the furnace will start up Tuesday.

EUREKA DISTRICT.

THE MINES.—*Sentinel*, June 23: The K K furnace is working smoothly on Phenix ore. Two train loads, about 120 tons, were sent down from the mine yesterday. Work has been commenced on the Atchinson Union. A shaft will be sunk a sufficient depth to demonstrate the value of the discovery. The machinery at the Alhion is working very smoothly without hitch or delay. The boys are unanimous in the opinion that steam is far ahead of hand power in working mines. The new hoisting machinery for the Kit Carson mine has been purchased and will arrive in about 10 days. A force of men are at work getting the mine in shape for active operations. Salt Lake buyers are about closing a contract with an Adams hill mine owner for 1,000 tons of ore. The Jackson company are actively at work prospect-

ing their mine. There has been no new developments.

RICHMOND CON.—Says the Superintendent's report: Week's run, \$75,000, from 1,060 tons of ore. Week's product of refinery, \$56,000. Since my last, operations have been carried on in the mine and at the furnaces with usual regularity, and the developments in the mine have been equal to the extraction.

THE GEDDES & BERTRAND mine is coming to the front with a magnificent ore body that promises to rival, if not exceed, any deposit ever found in the property. We mentioned some two weeks since the fact of a bonanza having been found just below the 150 level. The vein was followed down to a point 40 feet from the 300 level, where it has opened out to a width of 14 feet. Assays taken from the face, at random, averaged from \$500 to \$800 per ton. From 15 to 18 carloads of crude bullion, valued at from \$20,000 to \$35,000, are shipped daily from Eureka.

REVELLE DISTRICT.

THE GILA.—Eureka *Sentinel*, June 23: Late reports from this mine are very encouraging. It is now believed that the original bonanza has been rediscovered. There was a displacement in the ledge, but after much prospecting its true course and situation has again been ascertained. The company has a splendid body of extremely high grade ore, and there can scarcely be a doubt that the Gila will again in the near future take rank as one of the dividend-paying properties of eastern Nevada. Bullion shipments are already on the increase, and the management is firm in the conviction that they now have a mine that will do to stand by, and that the confidence generally reposed in this property a few years ago was not misplaced.

TYBO DISTRICT.

THE MINES.—A correspondant of the Eureka *Sentinel* speaks of this district as follows: The mines of the Tybo Con. mining company still continue to furnish an abundance of ore for the steady running of the furnaces. A fine quality is being extracted from reserves on the fourth and fifth levels of the 2 G. mine. The new Casket shaft yields a good quantity of ore. The process of partially refining the bullion is carried on quite successfully, three shipments being concentrated into one. This constitutes quite an item, considering high freights and the present low price of lead. The mines in the surrounding country are attracting the attention of Eastern capitalists just at present. Morey, Hot creek and Rattlesnake district bid fair to become active camps during the summer.

WHITE PINE DISTRICT.

EBERHARDT & AURORA.—*News*, June 22: A change for the better has taken place in the formation of the ground here within the past two weeks. The hard spar has given out, and the ground is now a soft lime shale, which is quite loose, and at intervals small caves are encountered, which experts look upon as favorable indications of near approach to mineral deposits. The softening of the ground greatly facilitates the work of the contractors, last week 80 feet being driven, the best run, we believe, that has been done since the commencement of the work.

THE JENNIE A.—This company, which has for the past two years done constant and vigorous prospecting on their mine, are now rewarded by a good development of ore. They have 1,000 tons on the dumps, and 6,000 more exposed in the mine, ready for extraction. They are now making the necessary preparations for the erection of a 40-ton stone furnace, which they expect to have running by the first of August.

STARTED UP.—The King company's furnace at the Three-mile house, was fired up last Monday morning, and up to this time, has been running and turning out bullion very nicely. Six tons of bullion were shipped Thursday, and hereafter regular shipments will be made. We did not learn how high the bullion graded. It is the intention to make a 40 days' run, if sufficient ore can be had for that purpose.

Arizona.

MINES AND MINING.—*Enterprise*, June 19: Good mining and promising prospects all along the line just now. Commencing at the tail end of Bradshaw mountains, the Tiptop company's fine 10-stamp mill is crushing away, enriching its owners and the "chloriders" of Humboldt district, who get their crushing done at this mill, and who feel that under the present mill regime, they have rights which Superintendents are bound to respect. The district is fairly alive with industrious miners and prospectors. The same is true of Tiger, Pine Grove, Peck, Turkey Creek, Hassayampa and Big Bug districts. The Peck company's 10-stamp mill is doing excellent work. Mine looking real well. Tiger mine gradually growing better. Thorough mining being done on it. Azlan mill running first-rate. Plenty of water in the mountains, all of which augurs favorably for a flourishing and eminently satisfactory mining business.

PECK BULLION.—Boetcher's buckboard, with four bars of fine silver bullion, arrived here at 1 P. M. to-day; value of bullion, \$5,713. Mill running. Everything satisfactory. The road through the timber, from Precott to the mill, is about finished.

Colorado.

GEOLOGICAL PUZZLE.—*Sunshine Courier*, June 22: E. B. Dorsey, the California mining expert, who has been in Colorado for some weeks past, returned Monday from a trip to Rosita. While there he was shown several specimens of

ore from the Maine mine, owned and operated by E. C. Bassick. The specimens are boulders, from the size of a walnut to a ton's weight, and are covered with a coating of sulphurets of iron, copper, zinc, lead, gold and silver. The gold value of the ore is about 60%. The boulders themselves are porphyry, and some are quite soft and crumbling while others are solid. At the depth of 200 feet carbonate was reached, some of it imbedded in the porphyry. The formations above mentioned are a complete puzzle to all who have seen them. Their appearance upsets all geological and mineralogical theories now extant, and will doubtless prove a hard nut for the scientists.

GROWING TOWN AND A GRAND PROSPECT.—The little town which has sprung up at the Golden Age mine wears quite a thrifty appearance, and promises to become a permanent fixture. It is located at the head of a grassy gulch, near the summit of the divide, between the waters of St. Vrain and James creeks. A few steps takes one up to a sheer precipice where a magnificent view of the valley, from the divide south of Denver to the State line on the north, can be taken in at one sweep. And by simply turning in your tracks, the snowy range in its towering majesty—with Long's Peak visible almost to its base as a center piece—lies at your feet.

Montana.

ONE SHIPMENTS.—*Miner*, June 18: Every day during the last week long lines of wagons could be seen pulling out from the Original lode claims, heavily loaded with ore for the terminus of the Utah Northern. Upon inquiry, we learn from Mr. Jos. Rosenthal, the Superintendent, that the week's shipments from the Gouvon aggregate 80 tons, while something over 40 tons was the amount shipped from W. A. Clark's Discovery claim. Newark, N. J., is the destination of the greater part of this ore, but some of it goes much further—to Freiberg or Swansea—we are informed.

MACHINERY AND SUPPLIES FOR THE ALICE MINE.—Some idea of the capital required for the systematic working of a silver mine may be gathered from an inspection of the machinery and supplies for the Walker Bros.' mine and mill, received during the past week, and an enumeration of articles now on the road. First may be mentioned 60 tons of salt and 19 tons of quicksilver, now at the mill or on the road. But these two items are of trifling cost when compared with the 20 wagon loads of machinery and supplies received last Tuesday. In this lot were included two of Griffith & Wedge's double-cylinder hoisting engines, each of 80-horse power. Accompanying the engines are two 16-foot tubular boilers, each 54 inches in diameter, and a smoke-stack that will be 45 feet high and 46 inches in diameter when set up. Among the other articles received were 2,100 feet of one-inch cast-steel wire hoisting cable, 300 feet of three-quarter steel wire rope for guys, four cast-iron sheave wheels, each five feet in diameter, two iron reels, each four feet in diameter, one improved cage, one five-stamp mortar with stamps and everything complete for an additional five-stamp battery, new mullers for all the pans in the mill, a year's supply of new muller shoes, cast-steel dies and shoes for the entire batteries, dry-kiln plates, etc. In addition to this lot already received, 30 tons of freight, in which are included two Howell roasting furnaces, are now on the road and are expected to arrive within three or four weeks. Upon the first of July, still another train will leave Corinne, with 70 tons freight, consisting of dry kiln plates, steel shoes and dies, salt and supplies in general.

THE SILVER BOW AND BLACK TAIL FLUMES.—Work upon those flumes has been prosecuted with unremitting energy since the beginning of the hydraulic season, and there is now a fair prospect of a golden harvest to repay the labor expended upon them. In the main creek, Silver Bow, about 1,000 feet of flume is now in, a depth of about nine feet below the original surface having been reached. At this depth, with no sign as yet of bedrock, the gravel prospects from one-fourth to three-fourths of a cent, in shot gold, to the pan, the prospects continuing to improve steadily as the work advances.

Utah.

PARK CITY.—Salt Lake *Tribune*, June 23: The latest discovery here is the Mountaineer, located northwest of the Ontario mine. Five feet from the surface a 14-inch vein, assaying from \$40 to \$200 per ton, silver, has been struck. The Portland, located near the McHenry mine, has a four to ten-inch vein, with assays varying from \$30 up into the hundreds. The Tip has a fine eight-inch vein, assaying from \$10 to \$30. The prospect is located in Ontario gulch, half a mile north of the Ontario mine. In the Porcupine good and steady prospecting is going on. Ontario No. 2 looks well, and with energy the owners may look for good results. The Empire company are working extensively, developing their respective claims. Buildings are going up and good roads to their property are being made. Within a few weeks the whistle of their hoisting engine will resound through the mountains. The Ontario mine and mill are running along smoothly with a full force of men.

FOUR large boilers in the mills of the Chesapeake Nail Works, at Harrisburg, exploded on the 25th inst. with tremendous force, killing one man, wounding badly four others and tearing the mills to pieces.

News in Brief.

EX-GOVERNOR PACHECO is now a stock-broker.

FISHING in Lake Tahoe is reported very fine at present.

MERCEDES, Queen of Spain, is dying from bleeding of the lungs.

CHARLES MATHEWS, the celebrated comedian, died on the 24th inst.

THE Free Labor exchange found places last week for 84 men and 15 women.

JOHN O'SHEA, an old resident of Lake county, was drowned while bathing in Soda bay, in that county.

THE condition of the Emperor of Germany is satisfactory. His power of moving his left arm is increasing.

VANCE, ex-member of Congress, has been adjudged insane, and taken to Athens for confinement.

At Mansfield, Ohio, lately a mob of 20,000 persons broke into the jail-yard to witness a hanging.

MONSTROUS seals and sea lions are being caught in fishing nets near the mouth of the Columbia river.

GENERAL FORSYTHE, of Sheridan's staff, reports that there is no cause for an Indian alarm in Wisconsin.

NINE members of a gang of counterfeiters, having their headquarters near Baxter Springs, have been arrested.

In and about Lyons, France 200,000 women and girls work from 11 to 13 hours a day for an average of 40 cents.

A COMPANY will soon commence building a narrow-gauge railroad from the town of Sonoma to deep water on the creek.

A YOUNG lady, of Sacramento, is dangerously ill from the effects of using a chemical preparation to bleach her hair.

HIGINIO CIMA, a real estate agent, in this city, fired three bullets into his head last Monday, causing fatal injuries.

A MR. MACKENZIE is agitating a project in London for opening up Central Africa to European commerce and civilization.

TWELVE thousand tickets for the Union Sunday School picnic at Woodward's Gardens have been sold, and more are wanted.

THE Russians have 52,000 sick in the Balkan peninsula, and of the recruits raised in 1877 for the Armenian campaign, 25% are dead.

THE Bear River ditch company, of Placer county, offer free water for five years for the irrigation of orange or lemon plantations.

A TROUBLE has occurred among the Trustees of the Mechanics' institute, in this city, which may possibly postpone the contemplated fair.

THE works of a plow company on Passaic river, New Jersey, have been burned, throwing many men out of employment; loss \$100,000.

On the 21st inst., Edmund Hanrahan killed his wife Mary, and Michael Sheehan, in San Francisco, with an axe, being actuated by jealousy.

A MAMMOTH bark is being built on Puget sound for the San Francisco lumber trade. Her carrying capacity is to be 1,000,000 feet of lumber.

DEL NORTE county bids fair to become the great butter county of the State. This county shipped, during the last season, \$50,000 worth of butter.

MADAME BONAPARTE, of Baltimore, who is about 96 years old, is in the enjoyment of fair health, having recently recovered from a severe attack of illness.

THE decline in rents at New York, this year, makes a difference of \$1,000 a day in the income of the Astor property and of about \$100,000 a year on the Stewart property.

PAUL J. KEDROLIVANSKY, Russian Archbishop, died in this city, last week, from fracture of the skull, but whether it was a case of assassination or suicide seems doubtful.

NINETY-SIX pounds of ice per man is daily consumed in the lower levels of the Consolidated Virginia and California mines in cooling the drinking water for the miners.

THE whale fishery at San Simeon, Cal., has been unsuccessful the past season, but three whales have been captured, while in former years as many as 23 have been taken in a single season.

PRESIDENT MACMAHON, upon the recommendation of his Ministers, has decided to pardon 800 communists on the occasion of the national festival, on the 30th inst., in honor of the exhibition.

DESIDERIO PODERCA, second in command at San Elizario, who commanded the firing party, in December last, that executed Howard, Atkinson and McBride, was arrested on the 16th by State troops.

A TERRIBLE rain fell in southwestern Kansas last week, 25 inches falling in one afternoon. Great damage was done to the crops, bridges, etc. Some lives were lost and many cattle, hogs and poultry drowned.

On Sunday last the advance of troops of Gen. Howard attacked the Indians at Curry creek, 45 miles from Harney, Col. Robbins and two soldiers were killed during the engagement. The Indians were repulsed.

It is reported that farmers in various parts of Ohio are receiving notices signed, "Working-men's Bread and Blood Committee," and warning them against buying labor-saving machinery, and especially self-binding reapers. Threats are made that every such reaper will be destroyed and stacks of grain burned if an attempt is made to use them. No cases of violence, however, have yet been reported.

THERE are 146 convicts in the Nevada Prison at Carson.

Most of the Shoshones in Nevada refuse to join the hostile Indians.

PLYMOUTH CHURCH has excommunicated Mrs. Elizabeth Tilton.

GARIBOLDI is well again, and has resumed his walks round Caprera.

THERE were last week 400 births and 462 deaths in New York city.

THE thermometer in Tulare county, last week, ran up to 101 in the shade.

TEN thousand orange trees have been planted in the vicinity of San Jose, this spring.

FOUR young men were drowned at Halifax on the 26th inst. by the upsetting of a boat.

THE entire expense of Americans going abroad this summer will amount to about \$40,000,000.

OVER 150,000 young shad have been received in Sacramento, with which to stock California rivers.

THE estimated annual loss to agriculture in the United States from insects is not less than \$150,000,000.

MR. EDISON is going to Pennsylvania to rest, and "get away from curiosity hunters and interviewers."

CARDINAL ANTONELLI's estate, something like the Ward property, has shrunk from \$2,000,000 to \$120,000.

At her wedding, lately, the bride of W. W. Astor wore a diamond necklace worth \$500,000. It was the gift of Mrs. J. J. Astor.

T. V. ROY, a converted Brahmin priest, in Montreal, convicted of bigamy, has been sentenced to three months' imprisonment.

THERE is a rumor of gigantic land frauds having been perpetrated in California through counterfeiting the great seal of the State.

JAMES G. FAIR, of Virginia City, is at the Palace hotel, his health having been much improved by his late visit to the Steamboat springs in Washoe.

A PARIS publishing house is preparing an edition of the Lord's Prayer in 1,200 languages and dialects. The book will be dedicated to Pope Leo XIII.

THERE is a terrible famine in the southern part of Morocco, caused by drouth. The inhabitants are said to be so reduced that they resemble living skeletons.

THE famous stallion "Cognac" (the man-eater), whose leg was broken about 10 days since from a kick by a mare, died on Sunday evening last at Petaluma.

At Savannah station, Los Angeles, last week, Charles Ellis, aged 15 years, was dragged to death by a horse to which he had thoughtlessly tied himself with a rope.

THREE car loads of excursionists left Salt Lake City, on the 25th inst., for San Francisco. They will take in the sights of California and expect to be absent a month.

It is ascertained that 2,748,000 sheep perished in New South Wales last year from want of food and water, caused by the protracted drouths, involving a loss of £2,250,000.

WILLIAM SOLEN has recovered \$15,000 damages from the Virginia and Truckee Railroad Company for injuries sustained from being run over by an engine, February 25th, 1876.

TOM WALLACE, the burglar, who so boldly walked out of the Municipal court-room in San Francisco while on trial some months since, has been recaptured at Evansville, Indiana.

JOHN B. CROWELL, one of the head men in the factories and tannery of Holden & Co., at Napa, committed suicide by cutting his throat with a razor. Temporary insanity was the cause.

ANDREAS JACOBSEN, a lad 17 years of age, while driving a horse in the bark-grinding mill in Wick's tannery, Petaluma, was kicked in the abdomen by the animal and so badly injured that he died.

ALEXANDER SLIEY and Frost Coles, brothers-in-law, fought a duel lately at Forest depot, Va., with carving knives. Sliey was killed and Coles dangerously wounded. They had both recently been married.

EL DORADO COUNTY is employing a large number of boys in preparing for the canning and drying season. In one single establishment, \$13,000 will be expended for material and labor.

SAN JOAQUIN VALLEY INDUSTRIES.—The edition of the Stockton *Daily Independent* of the 15th inst., is a most praiseworthy publication. It contains an exceedingly interesting and well written article, giving an account of the past history and present condition of Stockton. The article contains a great deal of statistical information in connection with the grain-raising interests of the State. It is, in fact, one of the most important papers yet written on the San Joaquin valley and its agricultural, business and industrial interests. In connection with it is published a large and replete map of the San Joaquin and Sacramento valleys, drawn by Mr. Jas. D. Schuyler, one of the editors of the paper. Anybody who wants to know anything about the resources of the valleys referred to or any matters connected with them, should get this number of the *Independent*. The edition is one of the most commendable we have seen and adds another point in favor of one of the leading and most enterprising journals in the State.

NARROW GAUGE CONVENTION.—E. Hulbert, Secretary, announces that he will call a convention of the National Narrow-Gauge Railway Association at Cincinnati, at an early day, at which it is hoped all the features of the rapidly spreading narrow-gauge system will be brought up and discussed.

Mining Ropes.

From an interesting review in the *Colliery Guardian* of a work entitled "A Descriptive Treatise on Mining Machinery, Tools and other Appliances used in Mining," by Geo. G. Andre, F. G. S., we take the following extract from the original for our readers. From the contents of the work, its author, and the specimens appended we agree with the *Guardian* "That those of our readers who desire to invest the needful cash, may safely purchase the two handsome volumes which Mr. Andre has just added to mining literature."

On the subject of pit ropes, the author gives the following formula and table which readers may find useful in determining the dimensions of a rope of a given material required to bear a given strain:

If C = the circumference of the rope in inches, and W = the breaking weight in tons, then for hempen ropes $W = 0.2 C^2$, for iron-wire ropes $W = 1.5 C^2$, and for steel-wire ropes $W = 2.5 C^2$. The safe working load may be taken at from one-fifth to one-seventh of the ultimate strength, according to the speed at which it is to run and the vibration to which it is to be subjected. Thus for iron-wire rope, the safe working load L will be $L = \frac{1.5 C^2}{5}$.

$L = \frac{1.5 C^2}{6}$, or $L = \frac{1.5 C^2}{7}$, according as the

speed of winding is to be moderate, high, or very high. Assuming the circumference to be 4 inches, the values of L will be 4.5 tons, 4 tons, and 3.5 tons respectively. The weight of the rope hanging over the pulley is, of course, included in the working load. A sufficiently close approximation to the safe working load of round wire ropes moving at high speeds may be found by multiplying the weight of the rope per fathom in pounds by five for iron wire and by eight for steel wire, the product being taken as representing hundred-weights. Thus the weight of a four-inch rope being 14 lb. a fathom, we have $14 \times 5 = 70$ cwt., and $14 \times 8 = 112$ cwt. respectively, for iron and steel wire. As before remarked, all of these results must be regarded as rough approximations, and, therefore, it is necessary, in determining the dimensions of a rope, to allow a wide margin of safety, which should never be less than one-fifth. Taking it generally at one-sixth, we may find the circumference of the rope by transposing the preceding formula in the following manner: $C = \sqrt{4 L}$ for iron wire and $C = \sqrt{2.4 L}$ for steel wire. If the working load be four tons, the requisite circumference of an iron rope will be $\sqrt{4 \times 4} = 4$ inches, and of a steel rope $\sqrt{2.4 \times 4} = 3.1$ inches.

Upon this page will be found a table showing the results gained with ropes of different sizes and materials, tested by this method.

In estimating the strains upon a rope, we must take account of that which is exerted upon it at starting. While the rope is moving at a uniform speed, the strain upon it will evidently be that of the working load. But as the load starts from a state of rest, the velocity is an accelerated one from the moment of starting till that in which the maximum speed of ascent is attained, and during this time the strain upon the rope will be greater than that due to the load, since a portion of the force exerted is expended in giving velocity to the load. The strain upon the rope during the time of accelerated motion is given by the following formula:

$$L = W \times \frac{W_s}{32.2 t} \text{ in which } L \text{ is the load required, } W \text{ the weight of the working load, } s \text{ the full speed in feet a second, and } t \text{ the time in seconds during which the accelerated motion takes place. Thus if the working load be 2 tons, and the full velocity 10 feet a second, the strains upon the rope will be}$$

$$2 + \frac{2 \times 10}{32.2 \times 5} = 2 + \frac{20}{161} \text{ tons, assuming that five seconds are occupied in getting up the speed.}$$

"One disadvantage of wire ropes is, that in passing over the pulley and in coiling round the drum they raise the load by a series of short vertical jumps, and thereby occasion a jerky strain, which tends to cause a rupture of the wires. This jerky motion, which is greatest in flat ropes, is diminished by increasing the diameter of the drum. Another serious disadvantage to be guarded against in using wire ropes is their liability to break suddenly without having previously exhibited any indications of weakness."

ELECTRICAL EXPERIMENTS.—M. G. Plauts has made some experiments upon distilled water with an electric current of high tension, by joining 20 secondary batteries, of 40 couples each, producing a current about equivalent to 1,200 Bunsen elements. He thus produces a number of beautiful luminous effects, constituting "a true electric kaleidoscope," imitates the phenomena which result from the fall of liquid drops in a plain surface, and shows that, with a sufficient quantity and tension of electricity, we can obtain not only electrified liquid globules, but even the electric spark itself in a globular form.

THE Eureka Con. mine in Nevada turns out weekly about 370 tons of crude bullion, valued at \$100,000.

Comparative Table of the Weights and Strength of the Hempen and of Wire Rope.

FLAT ROPES.									
HEMP.		IRON.		STEEL.		EQUIVALENT STRENGTH.			
Size in inches.	Weight per fathom. Lbs.	Size in inches.	Weight per fathom. Lbs.	Size in inches.	Weight per fathom. Lbs.	Working load. cwt.	Breaking load. Tons.		
4 + 1/4	20	2 1/4	11	—	—	44	20		
5 + 1/4	24	2 3/4	13	—	—	52	23		
5 1/2	26	2 3/4	15	—	—	60	27		
5 3/4	28	3 + 1/4	16	2 + 1/4	10	64	28		
6 + 1/4	30	3 1/2	18	2 3/4	11	72	33		
7 + 1/4	36	3 3/4	20	2 3/4	12	80	36		
8 1/4	40	4 + 1/4	22	3 + 1/4	13	88	40		
8 3/4	45	4 1/2	25	3 1/2	15	100	45		
9 + 1/4	50	4 3/4	28	3 + 3/4	16	112	50		
9 3/4	55	4 3/4	32	3 3/4	18	128	56		
10 + 1/4	60	4 3/4	34	3 3/4	20	136	60		

ROUND ROPES.									
HEMP.		IRON WIRE.		STEEL WIRE.		EQUIVALENT STRENGTH.			
Circumference. Inches.	Weight per fathom. Lb.	Circumference. Inches.	Weight per fathom. Lb.	Circumference. Inches.	Weight per fathom. Lb.	Working load. Cwt.	Breaking load. Tons.		
2 1/4	2	1 1/4	1	1	1	6	2		
3 1/4	4	1 3/4	2	1 1/4	1	12	4		
4 1/4	5	2	3	1 3/4	2	15	5		
5 1/4	7	2 1/4	4	2	2 1/2	21	7		
6	9	2 3/4	5	2 1/4	3	27	9		
6 1/4	10	2 3/4	5 1/2	2 1/2	3 1/2	33	11		
7	12	2 3/4	6 1/2	2 3/4	4	39	13		
7 1/4	14	3	7 1/2	2 3/4	4 1/2	42	14		
8	16	3 1/4	8	2 3/4	5	48	16		
8 1/4	18	3 1/4	8 1/2	2 3/4	5 1/2	51	17		
9 1/4	22	3 3/4	10	2 3/4	6	60	20		
10	26	3 3/4	11	2 3/4	6 1/2	66	22		
11	30	4	12	3	7	72	24		
12	34	4 1/4	13	3 1/4	8	78	26		
		4 1/4	14	3 1/4	9	84	28		
		4 1/4	15	3 1/4	10	90	30		
		4 1/4	16	3 1/4	11	96	32		
		4 1/4	18	3 1/4	12	108	36		
		4 1/4	20	3 1/4	12	120	40		

Mount Whitney vs. Fisherman's Peak.

The *Inyo Independent* contains a letter written by Prof. Brewer of Yale college in relation to the Mount Whitney controversy, in which he says: So far as one man could do it, I named the highest peak of that region Mount Whitney in 1864; for that right belongs not to me personally, than the exploring party of which I had command named it that time, on an expedition which I had planned and carried out so far as the means at my disposal allowed. We then named the highest peak in that group or region, published it to the world and very soon it had passed into the geographical literature of the world.

There was then no mistake or question as to which peak was called Mount Whitney, or which peak was the highest, or who discovered which was the highest. Mistakes and confusion came in later by giving the name to two peaks. This arose at first from a natural mistake, and afterward became curiously mixed into personal feeling. With those purely personal matters I have no wish to meddle. Whether Goodyear likes King or not; whether Lieut. Wheeler loves Prof. Whitney or not; whether Bowen and others are pleased with the late State Geological Survey, or its chief, or not, are matters which you may or may not be familiar with, which I do not care to discuss and which have absolutely nothing to do with the question as to the discovery and naming of the highest peak of that region.

The real question is a very simple one: Shall the name be allowed to stand where I (or my party) placed it in 1874? It was placed there when the first scientific exploration of that group of peaks was made. Had I then acted on the policy some later explorers have adopted, the late mistake might never have arisen. Had I then cared more for the *clat* of personally ascending what we believe to be the highest peak of the Sierra Nevada and less for what I believed to be the best for science and the State, I would have turned southward and made that a more prominent part of the summer's work. As it was, I chose what I thought to be the most important, as well as the most laborious part, although the least interesting, of filling out the reconnaissance to the northward, and sent Clarence King to get on the peak if he could with the scanty means I could furnish him. Any attempt to take Whitney's name off the peak where he put it will only advertise it the more.

GRAVEL MINING IN NEVADA COUNTY.—The Nevada Transcript says: The ordinary observer, unacquainted with the workings of the gravel mines, would have but a poor idea of the immensity of Nevada county's gravel mining resources, were he to rely on mere exterior indications. But to those who are conversant with what is being done in the way of hydraulic mining, the richness of our mineral resources is a matter of much pride, and they understand why it is that each year adds the appearance of prosperity to the community. We will cite the monthly yield, at the present time, of five of these bonanzas, with the workings of which we are personally acquainted. The largest of these makes an average monthly clean-up of \$50,000; two others of about \$40,000 each; still another of some \$30,000, and another that cleans up from \$10,000 to \$12,000 every three or four weeks. For various reasons, which mine owners understand without explanation, we are requested not to name these mines in connection with what they are doing until after the season's run has been made.

Coke from Anthracite Dust.

We know of several who have been interested in the coking of some of our poorer coals, and for their information we reprint the following from the *Metalurgical Review* by Jones Wister:

At the suggestion of a member of the Geological Survey of Pennsylvania, the writer made a number of experiments in using anthracite coal as a basis for coke. The additions of bitumen, gas tar (gas works waste) or bituminous coal, were all used in the mixtures with a view to supplying the necessary cementing qualities lacking in anthracite. An ordinary blacksmith's fire supplied the heat required, blacklead crucibles of about one pound capacity being used to receive the mixtures. The result arrived at proved several points:

1. That any mixture varying from 50% anthracite dust and 50% bituminous dust to 75% anthracite dust, 10% gas tar or bitumen—for they are interchangeable—and 15% bituminous dust, will make a beautiful steely, lustrous, heavy coke.

2. That a heat higher than can be obtained in a cooking oven is an absolute necessity to produce a good anthracite coke.

3. That in order to obtain a commercial success in producing anthracite coke, the utilization of the gas contained in the bitumen and bituminous coal must be a part of the process, at the present price of anthracite coal.

It may be interesting to state that through the kindness of the Harrisburg gas company the writer was enabled to make an experiment on a large scale; 260 pounds or 52% anthracite dust, 150 pounds or 30% bituminous coal dust, and 90 pounds or 18% gas tar, were taken, making a charge of 500 pounds, which was placed, after thorough mixture, in three ordinary cast-iron retorts. For four hours these retorts were subjected to the bright red heat employed in making illuminating gas in iron retorts. The coke resulting was perfect, though not hard enough for blast furnace use. It was tried in a blacksmith's fire and produced a very high heat, quite equal to that of the best soft coal fire, with the advantage of making a fire free from smoke. Were it possible to make anthracite coke on a large scale equal to what can be produced in a small way, there is no doubt that the vast hills of anthracite dust now cumbering the earth near the breakers would be utilized. The following mixture will make a solid, lustrous coke, provided the anthracite coal dust is finely pulverized and the bituminous coal and gas tar are thoroughly mixed before charging, and are subjected to white heat for about one and a half hours; 65% anthracite dust, 25% bituminous coal dust, 10% gas tar. The attendant loss of weight amounts to from 22% to 25%. A good coking bituminous coal was subjected to a similar treatment as the above mixture, and the result was an inferior coke, notwithstanding the fact that some coal coked well in a blacksmith's fire.

FORMATION OF CARBONATE OF LEAD.—S. de Luca describes six bronze goats, with lead bases, found in Pompeii. They were evidently designed for weights. The lead has been mostly changed into an amorphous mass of white carbonate. On the smallest weight a portion has become translucent and partly crystalline. On the largest weight there are definite crystals of carbonate, with a brilliant luster. Their formation, in a period accurately known, is noteworthy.

THE ENGINEER.

Flooding the Sahara.

This project is still engaging attention in England. Mr. D. Mackenzie lately delivered a lecture in London on a project for opening up Central Africa to commerce and civilization. The chair was taken by Mr. S. Cave, M. P., who, in his opening observations, fully recognized the importance of Mr. Mackenzie's project, without at the same time pledging himself as to its entire practicability. There was no doubt but that if the water of the ocean could be let into the desert the climate, the soil, and the sanitary condition would all be improved, as had already happened in the case of the Suez canal, the land about which had been changed from barren sand into a garden in which were cultivated tamarisk, the palm and the sugar-cane. Civilization would be served by the facility given for piercing Central Africa. Should Mr. Mackenzie's project prove a success ships might go from Southampton to Timbuctoo without breaking bulk. The lecturer began by stating that Africa was three times the size of Europe, and contained 200,000,000 of inhabitants. The only means of communicating with the rest of the world lay in the caravan tracks. In the Sahara desert there was a remarkable depression covering an area of about 60,000 miles. This depressed portion of the desert was called Eljuf, and was said to extend from within 12 miles of the sea-shore to regions in the close neighborhood of Timbuctoo. The theory of both ancient and modern geographers was that Eljuf was originally filled with water, which flowed into the ocean; but that a har having gradually formed at the entrance, the flow inwards was stopped, and the heat of a vertical sun caused the inside water to evaporate. After some further details, the lecturer recommended the establishment of a missionary and commercial station at Cape Suby, on the seaward side of Eljuf, and the raising of a fund of £2,000 for exploration purposes, and to test the practicability of reopening the ancient channel, and of letting the water of the Atlantic into the depressed portion of the desert.

Expedition to the Land of Midian.

The English technical journals are just now full of accounts of Captain Burton's exploration of this re-discovered El Dorado. The expedition was fitted out under the auspices of the Egyptian government, and occupied some four months in the work of examination, having traveled and voyaged over 2,500 miles. The result appears to have been highly satisfactory, as the expedition has just returned to Cairo, loaded with specimens of valuable minerals and with much special information. The collections made comprise, as reported in *Nature*, 25 tons of rock specimens illustrating the geology of the country; six cases of ores; five cases of coins, inscriptions, worked stones, fragments of melted metals, glass and pottery; more than 200 sketches in oil and water colors; photographs of the chief ruins, including the catacombs, temples, etc.; and finally maps and plans of the whole country, including 32 ruined cities, besides sketches of numerous locations where perambulating bands of miners, ancient and modern, have carried on mining operations. The specimens include argentiferous and cupriferous ores from Northern Midian, and auriferous ores from the south. There are collections from three turquoise mines. There exists, likewise, two great sulphur mines—one in the north, and the other in the south. Rock-salt occurs in abundance in two large lakes. The whole of the secondary formation of the region abounds in gypsum, and parts of it contain quantities of alabaster, of which traces of ancient quarries still exist, which appear to have supplied a number of the ruined cities.

Narrow-Gauge Railroads.

The *Railway Age* has compiled a table giving the localities, names and length of all the narrow-gauge railroads in the United States, to which is appended a summary here copied:

	Miles.		Miles.
Alabama.....	5.50	Nevada.....	119.75
Arkansas.....	73.00	Nebraska.....	26.00
California.....	210.05	New Jersey.....	63.17
Colorado.....	370.05	New York.....	56.29
Georgia.....	90.00	North Carolina.....	21.50
Illinois.....	214.50	Ohio.....	317.19
Indiana.....	63.86	Pennsylvania.....	205.43
Iowa.....	150.43	South Carolina.....	45.08
Kansas.....	84.00	Tennessee.....	36.41
Kentucky.....	23.50	Texas.....	164.50
Louisiana.....	5.50	Utah.....	184.75
Maine.....	15.00	Virginia.....	53.00
Massachusetts.....	34.16	Washington Ter.....	53.50
Michigan.....	40.50	West Virginia.....	19.40
Minnesota.....	30.00	Wisconsin.....	75.50
Mississippi.....	81.00		
Missouri.....	81.35	Total in U. S.....	3,082.24

Remarking upon the table, the *Age* says: "All of the roads named are three feet gauge except 13 of three feet six inches, one of three feet four inches, one of two feet, and one of 10 inches. The three feet measure is therefore the established narrow-gauge of the country, although it is not at all improbable that a still narrower gauge may come into use to some extent."

TRANSPORTATION THROUGH FRANCE.—The *British Trade Journal* calls attention to an unassuming exhibit of models, plans, and maps,

occupying only a small space at the Paris exposition. They represent a scheme which is calculated to exercise a powerful influence on Levant trade, and may be to wrest from Marseilles its commercial supremacy in the south of France. The collection of models and maps now on exhibition at the Paris shows the construction of a canal between the lower basins of the Rhone—that is to say, just above the *barre*—and the gulf of Fos, thus looking upon the *barre* as an impassable barrier and making a new mouth altogether for the Rhone. This canal is finished and the town is building, and now a railway is in course of construction along the banks of the Rhone, connecting Arles and St. Louis, which will finish the scheme. The establishment of this new Mediterranean port and canal will, of course, greatly benefit French commerce, in consequence of the ease with which goods will be dispensed all over France through the medium of the vast ramifications of the Rhone; but this great scheme has also its importance for England. When the canal arrangements in the center of France are complete, the Rhone will be placed in connection with the northern and northwestern ports of France, and we shall be able to bring goods cheaply across France by water instead of toiling in an expensive voyage round Gibraltar and the bay of Biscay.

THE ST. GOTHARD TUNNEL.—Late advices contain the information that the irregularity of the rock formations met with in the prosecution of the tunnel work had disappeared, and that at the present time the work is progressing through regular strata. The work on the south side is still in the gullies, and makes an average daily progress of about 10 feet; while on the north the work has not yet penetrated through the serpentine, which geologists had estimated to be but one-half of the thickness actually pierced. In this rock the rate of progress is somewhat slower. Upon this topic, the following news item, which is now going the rounds, may be of interest, viz.: "A London dispatch, May 22d, says a popular vote in the Canton of Zurich, Switzerland, rejected the scheme for the supplementary grant to the St. Gothard railway, by a very large majority. Other Cantons will probably do likewise. So the railway must be completed by Germany and Italy or remain unfinished."

A STEEP GRADE.—The *Railway Age* says: One of the most remarkable examples of engineering enterprise and boldness is found in the narrow-gauge extension, just completed, of the Colorado Central Road from Black Hawk to Central. The distance between these two places is one mile, but to accomplish it the road has to climb an elevation of 563 feet by a route four and one-eighth miles in length. The undertaking was pronounced impracticable by many experienced engineers, but has been successfully accomplished by means of zigzagging switches, heavy rock cuts, some of them 50 feet deep, four bridges, numerous deep fills, one of 100 feet, and heavy masonry. The work, which is of the most substantial character, is said to have cost \$15,000 per mile, or about \$60,000. A standard gauge road over this route would have cost vastly more if it could have been built at all, which is doubtful—a very good illustration of some of the advantages of the narrow-gauge system for special localities.

OCEAN TRANSIT.—Since 1840, the fastest steamships in the Atlantic trade have increased their speed from 8.3 knots per hour to 15.6 knots, and the consumption of fuel per 100 indicated horse-power has been reduced from 4.7 hundredweight to 1.9. In 1877, there were 182 steamers of 556,650 tons in the service, of which 125 of 377,905 tons were English. The record of rapid passages since 1840 shows a gradual reduction from 14 days to seven, and during the same time 56 steamers have been lost, with 5,430 lives. The year 1873 was the most disastrous of any, even vessels with 829 lives being lost, among them the *Atlantic*, with 545 lives. In 1854, the *City of Glasgow*, with 490 lives, and the *Arctic*, with 322 lives, were lost, making that year, the next to 1873, the worst on record.

LAND MAKING.—It is well known that a very large area of valuable land has been added to the kingdom of Holland by reclaiming it from the sea. Active preparations are going on for the commencement of the long-projected work of draining the Zuyder Zee. A dam 25 miles long is to be carried across the gulf, and upon this pumping machines are to be erected having 10,000 horse-power, and capable of discharging from the inclosed sea a quantity of water equivalent to 6,500,000 cubic meters daily. The work, it is expected, will occupy 16 years for its completion, and its estimated cost will be \$70,000,000.

SPECTRAL PHOTOGRAPHS.—Capt. Abney has recently been meeting with marked and interesting success in photographing the red and ultra-red end of the spectrum. In one of the photographs which he exhibited at the April meeting of the Astronomical Society the spectrum with numerous sharply-defined lines was visible as far below A as that hand is below F—i. e., to a wave-length of 10400 10th meters. He used silver bromide combined with resins.

USEFUL INFORMATION.

Nature and Character of Alloys.

In his writing on the "founding of alloys" in the *Iron Age* Mr. Edward Kirk lays down the following formulas: Alloys of gold, silver and copper are generally superior in strength to any of the more fusible metals, and may be forged either when red hot or cold. These three metals seem to unite in any proportions, and always form an alloy that is malleable when either hot or cold.

Pure gold is but little used in the arts; it is then too soft. It is generally alloyed with silver and copper, both to harden it and depreciate its value. Alloyed with copper, it forms gold of a red tint; with silver, it forms gold of a green tint; and alloyed with both copper and silver, it gives intermediate tints.

Pure silver is but little used alone; it is generally alloyed with a small amount of copper, which does not change its color, and greatly improves its malleability and working qualities.

When gold, silver or copper are alloyed with the more fusible metals—lead, tin and zinc—the alloy is less malleable and ductile than alloys of gold, silver and copper. They are extremely red-hot, and when heated to redness they will fly to pieces under the hammer; and alloys of brass, hell metal, etc., must be treated with precaution, and should never be taken out of the mold while red-hot.

Alloys of two parts copper and one part zinc are very soft and malleable, and may be drawn by hammering or easily cut with a file, but an alloy of one part copper and two parts zinc is as hard and brittle as glass, and may be easily pulverized.

An alloy of two parts copper and one part lead makes a soft, malleable metal, but is inferior to an alloy of copper and zinc. In alloys of one part copper and one part lead the lead will ooze out in cooling. In alloys of one part copper and two parts lead the lead will not unite, but will sink to the bottom when cooling.

Alloys of six parts copper and one part tin make a very hard alloy, and the alloy gets harder and whiter the more tin is added. Alloys of tin and copper should not be too rapidly exposed to the air, for if a large percentage of tin is used it will strike to the surface and ooze out or make hard spots in the casting.

Alloys of zinc and lead cannot be made without the addition of arsenic, unless the lead is alloyed in a very small quantity.

Alloys of zinc and tin are very hard and brittle, and are but little used alone. By the addition of copper to alloys of these two metals, the alloy is rendered more malleable and soft.

Arsenic makes all alloys hard and brittle, and is very dangerous to use. It is seldom used except to impart fluidity to the very infusible metals.

Alloys of lead and tin are very malleable and ductile when cold, but at a temperature of about 200° Fahr. they lose the power of cohesion and are exceedingly brittle. The alloys of tin and lead partake of the general nature of these two metals. They are soft and malleable when cold, even when a small amount of brittle antimony has been added.

An alloy of six parts lead and one part antimony is very soft and malleable, but an alloy of three parts lead and one part antimony is very hard and brittle; and an alloy of one part lead and one part antimony is harder and more brittle than antimony.

A NEW PHOTOGRAPHIC PRINTING PROCESS.—A new process, devised by M. Pellet, for photographic reproduction, in blue lines on white paper, of industrial drawings, plans, maps, etc., has recently been brought before the French Societe d'Encouragement. It is based on the property of perchloride of iron of being reduced to protochloride by light. The latter salt is not changed by a solution of prussiate of potash, while the former is immediately colored blue. The copying paper is immediately sensitized by immersion in a bath formed of 100 parts of water, 10 of perchloride of iron, and 5 of oxalic acid (or other vegetable acid). The drawing, on transparent paper, is placed on a dry sheet of the copying paper, which is called "cyanofor," and exposed to the light under glass (15 to 30 seconds to the sun in summer, and 40 to 70 seconds in winter; in shade the exposure varies from 2 to 40 minutes, according to weather). The electric light may be used. After exposure the sheet is placed in a bath of prussiate of potash (15 to 18% of water), which immediately colors blue all the parts where the perchloride has remained intact, but does not affect the parts where the salt has been reduced by the light. Then the drawing is washed with water, and passed into a bath of 8 to 10% of hydrochloric acid, which removes the salt of protochloride of iron; then it is washed again and dried. The drawing now appears in deep blue tints on a very white ground.

WASHING FADING GOODS.—For washing goods that fade, use crude ammonia instead of soap. Soiled neckties may be made to look like new by taking one-half a teaspoonful of spirits of hartshorn to a teacup of water; wash well, and if very much soiled put through a second water with less ammonia in. Lay it on a clean white cloth and gently wipe with another until nearly dry. Then lay a cloth over it and smooth with an iron not very hot. If the colors fade it will all come back to its original hue. Use no soap, and do not rinse.

The Cost of Running Locomotives.

As described by the *National Car Builder*, a plan is in operation on the middle division of the Pennsylvania railroad for ascertaining the exact amount of coal consumed by each engine.

The engineers take their turn on the "first in, first out" principle, and each is charged with the quantity of coal he uses. When an engine comes in, the quantity remaining in the tender is carefully noted, and the out-going engineer is given checks on which he places the amount given at starting, and at the various points on the route. When he returns any surplus he may have is credited to him. Then from the car record office is obtained the number of cars taken and brought back, and the distance run; also the number of loaded and empty cars, three of the former being equivalent to five of the latter. To this is added the wood used in firing up, reduced to a coal basis. The result shows the pounds of coal used per car per mile, and the amount used by each engineer during the trip. Circulars are issued to the engineers, limiting the amount to be consumed per car per mile on the different classes of trains. The quantity for through freights is fixed at 2 6-10 pounds. At the end of the month, the number of cars each engineer has taken, and the number of miles they have been hauled is noted. Then the amount of coal he is permitted to use, and the amount actually used, are compared. If the actual consumption has fallen any number of pounds within the limits prescribed, the engineer and fireman are paid a premium on what has been saved.

Account is also taken of all stores used on an engine, such as waste, tallow, oil, etc., the coal consumed, and the repairs needed. From these, computations are made, and a monthly statement is issued called "a statement of the performance of the engines," which shows, among a great mass of other things connected with them, the cost of running an engine one mile. These statements reveal the fact that such cost varies from three to ten cents, according as the engine is old or new, and needs more or less repairs.

A New Modeling Clay for Sculptors.

For some time past a new modeling clay has been produced in Germany, and offered to the trade under the name of Plastiline, which has the advantage of not drying up, and saves the necessity of keeping the model continually under wet towels to prevent drying and cracking. Some sculptors, who are posted up in the progress of practical chemical applications, have tried tried to mix some glycerine in the clay, which tends also to keep it moist, but it is not liked so well, as it changes the nature of the clay somewhat and makes it sticky. The *Manufacturer and Builder* tells what this Plastiline consists of: A chemical analysis shows very easily that it is made of 10 parts fatty acids and fats, one part of oxide of zinc, six of sulphur and three of clay. To make it, a small amount of oleic acid, easily obtained from stearin candle factories and in some soap works, is mixed with zinc white and heated, so as to saponify the zinc with the acid, forming then a mass similar to wax when left to cool; this is then mixed with the rest of the fatty acids, the sulphur is then added in the form of flowers of sulphur, or otherwise very finely pulverized solid sulphur sticks; the clay is dried and also finely pulverized and all mixed as thoroughly as possible while warm.

Satisfactory results may be obtained by taking eight parts of glue separated with one part of zinc oxide, four parts of oleic oil, two of wax, six of sulphur and three of clay; as this gives a mass very much like the Plastiline, and will cost, when made wholesale, not over 25 cents per pound. It is stated that some German sculptors predict a great future for this modeling clay, as being far superior to the material heretofore used.

JELLY POWDER.—The well-known inventor and manufacturer of nitro-glycerine and dynamite, Alfred Nobel, has added another explosive to the list, the explosive "jelly powder," so called from its resemblance to calf's foot jelly. It consists of 94% or 95% of nitro-glycerine and 5% or 6% collodion cotton, so mixed as to assume a gelatinous form. It is tough, but can be easily cut with knives or shears, and applied to cartridge and balls. It is water-proof, acts in the same way as dynamite, but is at least 50% stronger, and does not possess the great defect of the latter in parting with its nitro-glycerine when damp.

GOOD HEALTH.

Resuscitating the Drowning.

Dr. Howard appears, as medical officer of New York harbor, to have had much to do with the resuscitation of persons who had been apparently drowned, and his method has received the approval of the New York Academy of Medicine. It has already received the national prize of the American Medical Association, and has been adopted by the Life-Saving Society of New York. His method is described as follows:

1. To Pump and Drain Fluids from Lungs and Stomach.—This is done by placing the patient face downward over a hard roll of cloth-

ing, so that the pit of the stomach is the highest point, while the mouth is the lowest. The operator supplements the pressure of his hands upon the back of the patient, above the roll, if necessary, with all the weight and force at his command.

2. For Artificial Breathing.—The patient, whose clothing is ripped open from the waist, is laid upon his back, and the pit of the stomach is made the highest point by a hard roll of clothing beneath the back, while the head is the lowest part. The wrists are crossed behind the head; these a second person, if present, pins to the ground with one hand, while with the other the tongue is held forward by a piece of dry rag. The greatest possible expansion of the chest is thus obtained. The operator, kneeling astride the patient, grasps the most compressible part of the chest, on each side of the pit of the stomach, and, using his knees as a pivot, throws forward, slowly and steadily, his whole weight, until his mouth nearly touches the face of the patient. Then, by a final push, he throws himself back to his first erect kneeling position. By the sudden removal of the compressing force, the elastic ribs spring back to their original position, and by this bellows action the air rushes into and is forced out of the chest alternately, as in natural breathing. Success may attend this process in a few minutes, but hope of a favorable result ought not to be given up under an hour.

In addition to its apparently superior effectiveness, Dr. Howard claims for this method the conspicuous advantage of unequaled simplicity. When he had the medical surveillance of such matters in New York, he found that one of the most noted facts connected with cases of suffocation and drowning was the probable absence of medical aid at the critical moment. Now, experience has shown that this method can easily be understood by the most illiterate persons, and may be carried into execution anywhere, with or without a doctor.

INFLUENCE OF GASLIGHT ON THE EYE.—The German Minister of Instruction has recently issued a report on the influence of gaslight on the eye. The conclusion arrived at in this report—the result of frequent conferences with well-known physicians—is that no evil results follow a moderate use of gas, if the direct action of the yellow flame on the eye is prevented. For this purpose screens or shades are employed. Very grave objections, however, exist to the use of zinc or lead shades, most evils affecting the eye being traceable to them. Their use, it is said, inevitably tends to blindness or inflammation and other harmful effects. The milky-white glass shade is the best, as it distributes the light and has a grateful effect on the eye. The burner should not be too close to the head, as congestions of the forehead and headaches result from the radiated heat. The glass plate below the gas, employed in some places, is especially useful for the purpose, as it causes an equal distribution of the light—necessary where a number are working at one burner—prevents the radiation of heat and tends to a steady illumination by shielding the flames from currents of air. In cases of highly-inflamed eyes, dark blue globes can be very beneficially employed. With precautions of this kind, no evil effects from the burning of gas need be feared.

VENTILATION OF SHIPS.—The Chief of the United States Bureau of Equipment and Recruiting says in his annual report: "I again respectfully ask the attention of the Department to the restricted space allotted to the crews of our ships of war. As a matter of efficiency alone, the health of the men is of primary importance. A ship loses her significance as a man-of-war unless manned by a vigorous crew. It is simply impossible to expect men to retain their health if compelled to herth and mess in the dense and mephitic atmosphere which is the natural result of their crowded quarters. Ventilation of our ships has never received the attention it imperatively demands. I respectfully urge upon the Department the propriety of appointing a board of medical officers to report upon this subject and to devise a method whereby the object may be assured." As an instance of the bad effect of crowding men on shipboard, it is mentioned that during the trouble between the United States and Spain, on account of the *Virginius* affair, when 3,000 additional men were enlisted for the navy, over 25% of them were incapacitated for service within a few weeks by reason of crowding them into vessels.

IMPORTANCE OF A CLEAN SKIN.—Most of our invalids are such, and millions of more healthy people will become invalids, for the want of paying the most ordinary attention to the requirements of the skin. That membrane is too often regarded as a covering only, instead of a complicated piece of machinery, scarcely second in its texture and sensitiveness to the ear or the eye. Many treat it with as little reference to its proper functions as if it were nothing better than a bag for their bones. It is this inconsideration for the skin that is the cause of a very large proportion of the diseases in the world. If, as claimed by some scientists, four-fifths, in bulk, of all we eat and drink, must either pass off through the skin or be turned back upon the system as a poison, and that life depends as much upon these exhalations through the skin as upon inhaling pure air through the lungs, it must be of the most vital importance to keep that channel free.

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The Week.

The weather during the past week has been comfortable enough in San Francisco and throughout the coast region, but very warm in the interior, the thermometer in some of the inland counties having touched a hundred. The grain harvest is now under full headway in all the great agricultural districts of the State, creating a demand for all the suitable labor available. For the first time in several years, the supply of farm labor is just now insufficient for the demand, wages for this service being at the same time well maintained. The cereal crops, though injured in some places by chess and rust, will yield above the average; pasture is abundant, the products of the dairy, the garden, orchard and vineyard greater than ever before. The mines of California are turning out more bullion than for several years past, only wool and honey, among our staples, showing this year much falling off. The near approach of our national holiday has had its usual effect of slightly diminishing the volume of business through a partial diversion of the public mind from industrial and mercantile to patriotic considerations.

This week marks an era in the life of the MINING AND SCIENTIFIC PRESS, as the present number is the last of Volume XXXVI. We hope that all our readers who are with us at the close of this Volume will remain until the close of the next and many more to come, and that their number will increase as the PRESS increases in years and usefulness. We will commence on a new Volume next week with renewed vigor and a hope that before it is closed the depression which has hung over the country for the past year will disappear and good times come again once more to us and all.

Placer Mining in California.

As is generally well known it was in the placer or surface diggings that the first gold mining in California was carried on. Being rich, extensive and easily utilized, the average earnings of the miners were at first very large. With the exhaustion of these surface deposits the miners earnings diminished, the amount of capital required for successfully engaging in this branch of business having meantime increased in a like ratio. What further resulted from the gradual depletion of this class of deposits was the searching after and finding of new kinds of placers, and the invention of both labor and gold saving methods and appliances in the prosecution of this industry. From the river bars, to which it was at first confined, mining was extended to the auriferous gulches and flats, then to the beds and banks of the streams, and still later to the old basins and channels filled in or buried up long ages ago. The gold-bearing bluffs and beaches were discovered, the re-washing of the accumulated tailings commenced, the seam-diggings revealed themselves, and new sources of gold production were in various other ways discovered or invented. Among the more economic devices early brought into use was the hydraulic plan of washing, which from a very cheap and simple application of water for the purposes of gold gathering, has grown into the vastly more expensive and effective apparatus now employed to that end. From mere cotyoling along the edges of the deep buried channels, drift operations have been carried far under the mountains, the great subterranean excavations being traversed now by iron tramways, over which the steam locomotive hauls the gravel trains, before dragged out by mule power or pushed out by hand.

In this province of mining gold savers and gleaners with new ways for effecting labor, cost, and retrenchment, have been introduced to an extent that covers the primitive business almost from sight. The pioneer gold seeker, unless kept posted, would fail to identify his old calling were he to revisit the scenes of his former labors, because of the new fields into which it has been advanced, and the many strange and monstrous modes and mechanisms adopted for carrying it on. He was credulous and visionary enough, this early seeker after the precious dust, and ever ready to bunt for the same in the most out-of-the-way places and by the most impracticable methods, yet it never entered into his plans nor yet into his wildest imaginings to search for it in the way we are now doing. It occurred to him to turn aside the rivers from their channels, and to sink shafts for getting down into the deep pits and basins, but to dredge out or tunnel under the river beds and lift the rich gravel from these depressions by hydraulic elevators, was left to be accomplished by modern inventors; this department of mining having been marked by more ingenious devices, bold and original enterprises and a more constant progression than any other.

While it is true that the more accessible auriferous deposits in California have been pretty well worked out, there are places where, because of a lack of water for gravel washing, they still remain almost untouched. In many of these localities good wages have been made the present season, water having been so much more plentiful than usual. Not more than two or three times perhaps during the past thirty years has the natural supply of water been so abundant and held out so well as this season; and, as our miners have not failed to turn the same to good account, bullion receipts from this source will this year be considerably augmented. As it would be difficult and in most cases impossible to bring water upon these gold-bearing grounds, because of their altitude or isolation, they will be likely to long remain a sort of preserve for the unemployed and claimless placer miner.

For the reason just mentioned this has also been an auspicious year for hydraulic operations, which now yield more than two-thirds of the revenues derived from placer mining in this State. With most of the small operators the season of active work has closed. The larger as a general thing continue washing, some running a diminished amount of water, and others a full head. A few companies like the North Bloomfield, Eureka Lake Consolidated, the Milton and the Nevada, having a great extent of catchment and large storage capacity, or like the Little York, almost perennial sources of water supply, send through their pipes nearly as much water as during the spring months. Within the next sixty days the flow with most of these companies will suffer serious abatement, though a few will probably be able to continue washing on a reduced scale throughout the season. So far as clean-ups have been made this year with the hydraulic miners, they have been large, much exceeding in the aggregate those of any previous year. Having removed or overcome most of the obstacles that barred their way to an earlier success, hydraulic miners and investors stand a good chance of making money hereafter. The future of this industry is, in fact, altogether encouraging. Where the conditions are favorable and the management good, profits may be counted upon with more certainty than attends almost any other branch

of mining. Where the conditions are adverse, as where there is insufficient water, lack of outlet, poor gravel, overlying or interposing strata of barren matter, sliding ground, beds of boulders, etc., then scarcely any class of mining is attended with so much vexation, disappointment and disaster. It is the case, too, that through the almost entire appropriation and employment of all the water within easy reach for washing purposes, this province of mining is incapable of much further enlargement. There is still here and there an opportunity for inaugurating a new enterprise of this kind, but as a general thing, only under restricted advantages and on a limited scale, Trinity, Siskiyou, and other of the more northern counties now presenting the best openings for this class of operations. In the more central counties of the State it only remains for parties wishing to engage actively in this business on a large scale, or to acquire extended proprietary interests therein, to purchase properties already outfitted and supplied with water, or else effect this by securing and aggregating many small claims into a single estate, as may sometimes still be done.

To the expansion of drift mining on the other hand, scarcely any limit can be set, as this class of diggings generally supply themselves all the water required for gravel washing, while their extent is very great. The explorations of the Pliocene basins and water courses which form the sites of these operations show them to traverse nearly all parts of our gold fields, presenting repositories of mineral wealth that only centuries of energetic exploration can exhaust. Being little dependent upon the weather or water supply, the returns from the drift mines since the business came to be prosecuted with more system and better understood, have been quite uniform, and in the main highly satisfactory. Every year increased attention is being paid to this class of diggings, Placer, Nevada, Sierra and Plumas having heretofore been the counties in which these deposits have paid the best and been most fully developed. Under the table mountains of Calaveras, Butte and Tuolumne the old channels have also been extensively and profitably worked. With the drifters generally, this has been a prosperous year, and there is every reason for believing the business will continue to thrive and expand into the undefined future.

Tailing claims, though not numerous, are paying remarkably well this year, and a number of projects for rehandling great quantities of this material have lately been set on foot, some of them being now fully perfected and ready for operations. In the rewashing of the auriferous debris that rests along the mountain streams and interior rivers of this State, another field is opened that strongly invites the attention of the capitalist and gold washer, and it will probably not be long till this neglected stuff will be made to yield up a large percentage of the gold, sulphurets and amalgam it is known to contain.

Cleaning out the modern rivers with dredging machines and exploiting their beds with tunnels, though yet in their experimental stages, promise good results, the few trials made with the hydraulic elevator, another novelty in placer mining, having proved wholly satisfactory. Of our gold beaches and bluffs, it can only be said, that while they are known to carry a notable quantity of free gold, the particles are so light and fine that they have, with few exceptions, eluded the efforts made to catch and collect them. Experiments, however, are still in progress, there being those who, after so many years of failure, are still sanguine that they will be able to make the washing of these gold-bearing sands remunerative.

A VAST AMOUNT OF WATER.—There are 2,000 tons of water being daily thrown out by the pumps at the C. and C. shaft. This has been going on for the past two years, and fully 1,460,000 tons of water have been discharged from the shaft during that time. The water is what the mine experts call regular "channel drainage," in contradistinction to the large subterranean reservoirs sometimes encountered. The water is raised nearly to a level with the upper floor of the main hoisting works, where it is discharged into a large box, the bottom of which is pierced with holes. It then falls in a shower to a large tank in the basement, when it is used in the condenser of the pumping engine. As the shower of water falls through the air a distance of over 20 feet it is much cooled. After it has been used in the condenser it runs away in a flume to the battery mill below, does its work there and then—carrying with it tailings—goes to the reservoirs above the Omega tailings on Six-mile canyon. The tailings are deposited in the reservoirs and the water goes to the mill where it is again used. Below the Omega mill, in conjunction with the streams of water flowing down Six-mile and Seven-mile canyons, it is used in other mills, and further down assists in turning the wheels of many water-mills.—*Territorial Enterprise.*

THERE are 2000 tons of water being daily thrown out by the pumps of the C. & C. shaft, at Virginia City. This has been going on for the past two years, and fully 1,460,000 tons of water have been discharged from the shaft during that time.

QUICKSILVER is about the only article of merchandise which just now shows life, the market being very strong at 42½ cents, with an upward tendency under a brisk demand and light receipts.

The Fumes of the Idria Quicksilver Furnaces.

(Translated from DINGLER for the MINING AND SCIENTIFIC PRESS.)

A few extracts from an interesting article on this subject by Teubner have appeared in various journals, we translate the article in full for the benefit of such of our readers as are interested in the subject:

The smoke of the quicksilver furnaces at Idria passes through condensation tubes cooled by means of water, then through a system of chambers and flues (into one central flue), and at the end of this system, in all 270 m. (885.79 feet) long, it passes out through a chimney 14 m. (45.93 feet) high. The necessary draft is produced by a grate-fire at the foot of the hillside upon which the central flue rests. The small amount of mercury which escapes from the chimney with the smoke is not mercury vapor, but is mechanically removed by the fixed ingredients of the smoke, the soot and dust. This amount of mercury is very variable, and according to Teubner (*Oesterreichische Zeitschrift für Berg und Huttenwesen*, 1877, p. 123,) varies from 1% to 47%. This total amount includes that which is there as metallic mercury as a salt (more particularly the basic sulphate), and as the sulphide (cinnabar dust).

For example, four soot analyses contained mercury as follows:

As a salt.....	7.32	3.06	6.10	12.69
Metallic.....	3.12	14.59	0.02	0.17
As sulphide.....	27.33	1.83	3.40	9.80
Total.....	37.77	19.48	10.42	22.66

According to three determinations of Paterna in the summer of 1876 there are discharged 201, 770 and 1,088 g., or on an average 686 g. (1.5 English pounds) of mercury from the central chimney, about 0.007% of the production. (Time is not mentioned, but probably every 24 hours is intended).

And as the mercury contained in the smoke is chiefly there as sulphide, so the fears of its deleterious influence on the neighborhood seems to be in every case exaggerated.

The first soot analysis gave the following results:

Metallic mercury.....	3.12
Mercuric sulphide.....	10.83
Mercuric sulphide (cinnabar).....	31.10
Ferrous sulphate (coppers).....	6.02
Magnesian sulphate (epsom salts).....	7.50
Potassic sulphate.....	1.24
Ammoniac sulphate.....	0.54
Silica.....	2.20
Organic matter soluble in ether.....	5.90
Water and aromatic matter (aromatizische Stoffe).....	10.30
Carbon.....	19.80
Total.....	97.65

The gaseous part of the chimney smoke consisted of sulphureted hydrogen, sulphurous acid, carbonic oxide, carbonic acid, oxygen, nitrogen and steam.

The sulphureted hydrogen and sulphurous acid were determined by weight, the other constituents by volume according to the methods of Bunsen. The following is the result of several analyses which agreed very closely:

Sulphureted hydrogen.....	0.004
Sulphurous acid.....	0.050
Carbonic acid.....	5.636
Carbonic oxide.....	1.740
Oxygen.....	15.400
Nitrogen.....	77.170
Total.....	100.00

Finally the amount of gas passing from the central chimney in 24 hours was determined, from the cross section of the chimney (1.331 sq. m. = 14.3 sq. ft.) and the velocity of the smoke. The latter was determined with sufficient accuracy by introducing small fragments of paper and noting how long it took for them to appear at the top of the 14 m. chimney. The velocity so determined was on an average 1.66 m. (5.45 ft.) per second. This gives, therefore, the following amounts of gas as discharged from the chimney in 24 hours:

Sulphureted hydrogen.....	5.9 cu. m.
Sulphurous acid.....	73.5 " "
Carbonic acid.....	8235.0 " "
Carbonic oxide.....	2558.0 " "
(1 cubic meter = 35.29 cubic feet.)	

From the action of the gaseous part of the smoke, therefore, there is little to fear, as in fact the uninjured vegetation about the central chimney and the whole region of the mountains within reach of the smoke plainly showed.

CONGRATULATIONS.—Taking up a pencil laden with the perfume of orange blossoms and the fragrance of wedding cake, we haste to extend our congratulations to a young gentleman in our employ, who has bravely crossed the line which separates nothing from everything. Our esteemed bookkeeper and accountant, Mr. W. H. Thompson, has so far advanced in mathematical accuracy that he has proved that one and one make one. The one in his case, or at least the better half of it, was Miss Katie Woodward, an accomplished young lady of East Oakland, who is now enshrined in a cosy home as Mrs. Thompson. Our sincerest wishes are for their success and happiness. May our associate's balances always be on the right side and his bills never grow longer than his coin bag.

The leading hotels of Oakland are crowded with guests.

Esmeralda District.

From Mr. Wasson's pamphlet on "Bodie and Esmeralda" recently issued, we take some facts concerning the famous Esmeralda district, which has recently come to life again and now attracts considerable attention. After describing the circumstances of the first discovery of the district, he gives more account of the progress of affairs and says: "Although exceedingly rich prospects were obtained on a score of claims and work on an unsystematic character performed on hundreds, no particular excitement was created until the fall and winter of 1862-3, when the Wide West bonanza was discovered. The first mill, however, was erected in 1861 by Edmund Green, the Superintendent of the Wide West. The ore chutes of the Wide West, Johnson, Chihuahua, Pond and Del Monte, covering an extent of ground of over 1,200 feet in all, were all of a character as to richness and size, and out of them the bullion was produced. A dozen other claims contributed more or less to the hullion product, as the Utah, Ural, Garibaldi, Young America, Live Yankee, Empire, etc. Middle Hill, next south, was comparatively untouched, though evidently the most solid formation for deep exploration in the district. Silver Hill, the most southern point of interest, is about as much broken up on the surface as Last Chance, yet much work, after a kind, was performed; the Antelope claim producing a great deal of bullion. Mining those days on the part of everyone, as a rule, consisted of exhausting the surface deposits, regardless of what might be below a certain level. The Esmeralda people appeared to be a sort of lost tribe, considering the rich ore as manna fallen from above, and after 'gobbling everything in sight,' getting 'out of the wilderness' as soon as possible.

"By the spring of 1864, no less than 17 quartz mills were erected in the district, 10 of them being in operation; the Wide West, now Del Monte, and Antelope mills costing in all more than half a million dollars. Excepting the last named and two small affairs, all of these 17 structures, many of which were costly, are missing, the machinery being carried off to other districts. In 1868 the Union mill in Aurora was torn to pieces simply for the purpose of securing the large quantity of rich amalgam wasted around the battery and pans, so reckless and extravagant had things been carried on in early days. Doubtless several millions of dollars floated off down the creek toward East Walker river. Rock that would not mill at least \$75 per ton was cast aside, and no doubt many thousands of tons of ore that would pay well to mill lie around loose yet, though the crevice miners, 'the coasters,' have culled things pretty closely. For several years subsequent to the great excitement, the old rich ore chambers constituted a sort of empty sugar barrel, out of which, like street boys, they obtained many a sweet toothful. John Neidy, present District Recorder, a man of good judgment, was a large operator in this way, realizing in the course of three or four years over \$75,000. This coyote work has left most of the old shafts, drifts and tunnels, such as they were, in a state of confusion worse confounded. They were started everywhere and have ended nowhere."

Mr. Wasson states that it has been a difficult matter to get at the yield of the district during those days. J. S. Jamison, formerly in the express office at Aurora, is of the opinion that about \$12,000 altogether was sent from there prior to 1869. On the cause of the decline of the district, Mr. Jamison also writes: "My idea of the cause of the decline of the district, and I believe the generally received opinion is, that just at the time (1864-5) the rich surface deposits became exhausted, there was a great and general decline in all mining shares, and this, together with a great amount of litigation in regard to conflicting titles, caused stockholders in the various companies to refuse to pay or furnish the money necessary to prospect the mines to any great depth below where the surface deposits had given out.

"In other words, the surface deposits on the Comstock were exhausted, the shares dropping in value after the manner of Wide West and Del Monte, which were at one time selling at \$500 and upwards. [The law suits between the Wide West and Johnson claimants, the Del Monte and Pond, the Antelope and Young America, etc., forming a history of themselves. It cost the Del Monte about half a million for lawyers and shot-gun men. The labor performed on Last Chance hill presents to-day much the appearance of a military redoubt or series of intrenchments, where hand-to-hand fighting took place.] It became a question with the late W. C. Ralston, the holdest of operators, of abandoning either the Comstock

or Esmeralda mines. It was decided, at least, to sink deep under Mt. Davidson, and Mt. Braly, with its surrounding treasure hills, was left a solitary sentinel, as it were, over the most interesting ruins in the history of mining. Ralston, however, never gave up the idea of thoroughly prospecting Esmeralda district, and especially Last Chance hill, and to that end started up the old Juniata works at the ex-

dozen of the latter yet remain and being in particular demand. [Buildings that were sold for taxes one year ago now being valued at from \$10,000 to \$12,000 apiece.] After 14 years of neglect, the locusts are returning, and with a view of remaining indefinitely. So much depends upon the working of the new Del Monte, however, that speculation on that point is useless. Hundreds of wooden buildings were cou-

The Poor Man's Quartz Mill.

For several hundred years the Mexican arastra has constituted the poor man's quartz mill and the vein miner's best friend, inasmuch as it has during all this time furnished to his hand a cheap and simple means for earning an honest and independent subsistence, and very often for making a fortune besides. In the early history of California mining this primitive style of gold mill filled an important place, having been afterwards almost wholly superseded when our people became eager to earn money more rapidly and grew ambitious of conducting operations on a grander scale. But whether the laboring miner and even the capitalists has not been a loser through such a general substitution of complicated, ponderous and costly machinery for this rude implement is open to serious question. That the latter discounts the battery, copper plates, blankets, etc., as a means for saving the gold must be admitted, and it is hardly too much to say that many an enterprise that, burdened with the cost of a modern quartz mill, has resulted in failure, might through the employment of a suitable number of arastras have been made at least a moderate success. In Mexico 50 years ago the arastra was producing \$25,000,000 per annum. Mining there was then a grand success, the mass of miners being prosperous and happy. The English conceived the idea, so prevalent at the present time in California, that ponderous and extensive machinery, with its attendant expenses, would be correspondingly profitable. The fever ran high, they invested largely, and the result was as it has been here, failure in a great majority of the mining enterprises engaged in. Warned by these financial disasters, the Mexican miners have for the most part since stuck to the arastra, which with them remains the favorite apparatus for crushing the ores and amalgamating the precious metals.

We would not, of course, when the conditions are favorable, discourage the construction of large quartz mills, outfit and operated after the fashion now most in vogue. Very often these are the only establishments that can be made to pay. Where the ore is of low grade and abundant, men of large means should continue to engage in the business on an extensive scale. Under these circumstances heavy capital should be invested and great mills with their complicated gold-saving appliances be put up. But in most cases neither our mines nor our miners are thus conditioned. Generally our ores are of good quality but limited in extent, our mine owners being laboring men with but little money. What now they most require is the means to set themselves to work in a small way upon these properties. Having vainly solicited the aid of capital until they have become poor and tired of waiting, these men would gladly avail themselves of an opportunity, should any offer, to realize from their claims barely day wages. Now the question arises, how can this be done? With the old-fashioned slow-moving arastra even this is difficult. They need a machine which will combine something of its cheapness, simplicity and effectiveness with greater capacity for reduction. That the American miner will in this age of steam be satisfied with mule power, can hardly be expected. In some instances this will do very well, but as a rule steam or water must be had for the propulsion even of the arastra. To meet this requirement, Almarin B. Paul, the well-known millman and metallurgist, has invented an arastra that combines efficacy and economy in a large degree. Mr. Paul, who always works in the direction of our most pressing practical wants, has, to use one of his own expressions, fairly "Americanized the Mexican arastra," adapting it to our progressive ideas without divesting it of those distinctive features that so commend its use. The demand that has sprung up for this machine shows the appreciation in which it is held by our small mine owners, a considerable number of them having already been set to work in the mountains, where they have invariably given the greatest satisfaction. In another column of the PRESS will be found Mr. Paul's advertisement of this arastra, wherein the advantages claimed for it are more fully set forth and specifically described.



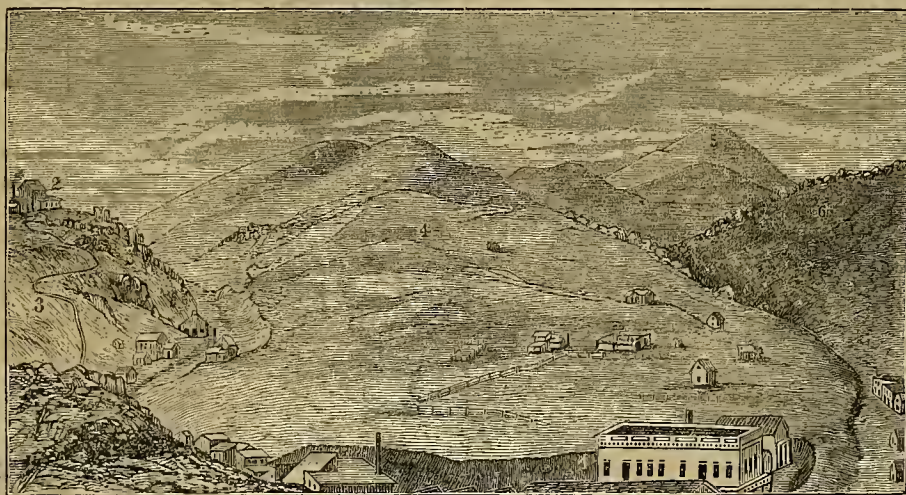
MAP SHOWING LOCATION OF MINES AT AURORA, NEV.

treme eastern base of Humboldt and Martinez hills; first, in 1872, and again in 1874. But this work was of a fitful character, not in a favorable locality, and on the occasion of his death was entirely stopped. The Bank of California fell heir to all the leading mills and mines, and out of this it may yet regain its former prestige."

It is a good many years since the old Esmeralda excitement, although many miners will

sumed as common fuel, a few of the very first and most worthless yet standing, affording a curious mixture altogether. In view of the town site of Aurora, 1 is the Court house and Esmeralda Herald office; 2, the new Real del Monte hoisting works; 3, Last Chance hill; 4, Middle hill; 5, Mt. Hicks; 6, Silver hill.

The new Real Del Monte company, incorporated in October, 1877, with a capital of \$5,000,000, and the Juniata with a similar capital.



VIEW OF AURORA, ESMERALDA DISTRICT.

recollect it. Now, as stated in previous articles in the PRESS, the district is in full swing again, with a number of mines in operation, a large amount of capital having been invested. The accompanying map will give the reader an idea of the position of the respective locations and a view of the town is shown in the other illustration on the page.

The town site is 8,000 feet high. Mt. Braly, in the background, is 10,000 feet. At one time Aurora had a population estimated at from 6,000 to 10,000, containing many substantial and presentable brick buildings. About a

Work is centered on the Del Monte. The Syndicate is a strong one, including Mackey & Fair, Sharon, Wells, the Cooks, Yerrington, Baldwin, Capt. Haynie, Boyd, Judge Belden and others. A first-class three compartment shaft is being sunk, and thorough and efficient work has been done by George Daly, the Superintendent.

The pamphlet from which these facts are gained gives a detailed description of all the mines in the district, with general information of all kinds of interest to miners. It is for sale at this office; price, \$1.

THE WEST SIDE CANAL.—The following is from the Stockton Independent of Thursday: The prospect for the completion of the West Side canal from Tulare lake does not seem flattering. The Commissioners have met and advertised for bids for the \$2,000,000 in 7% bonds which they are authorized to issue, the bids to be opened at Grayson on the first Tuesday in August. As they cannot negotiate them for less than 90 cents on the dollar, the general opinion seems to prevail that no capitalists will bid for them, and that the whole thing will fall through.

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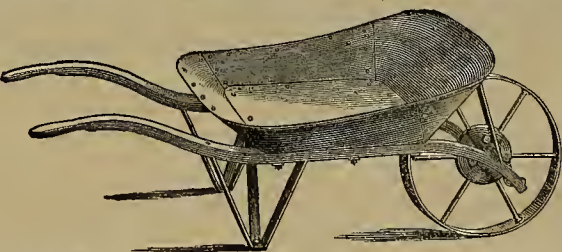
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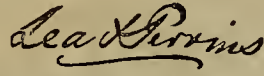
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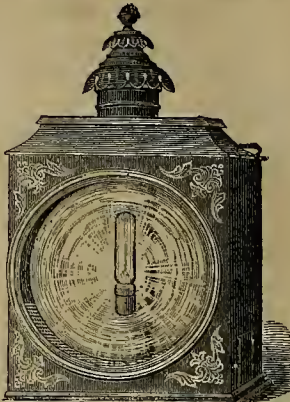
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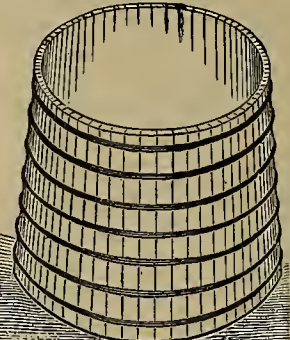
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This furnace is guaranteed to chloridize from 88 per cent. to 95 per cent. of the silver, and put gold in a state so that 88 to 95 per cent. of the battery assay can be obtained by amalgamation on any gold or silver ore ever formed by nature.

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One man, per day.....\$ 3 50
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From 2½ to 5 per cent. of salt is necessary.

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R. H. CAMPBELL, Superintendent Afterthought Mine, Redding, Shasta County, Cal.

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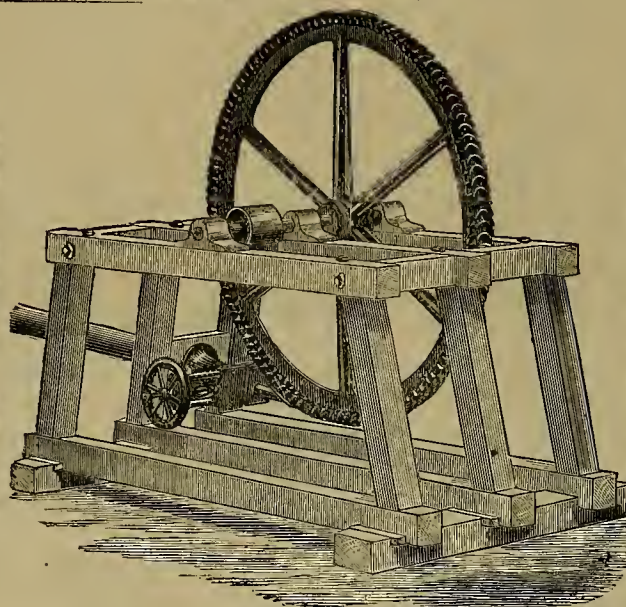
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This wheel possesses more power for a given percentage of water than any yet offered to the public. They are in practical use in many Mills and Hoisting Works, and never fail to give entire satisfaction, which facts speak fully for their efficiency, and render further comment unnecessary.

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The KNIGHT WHEEL is used in the following named Mills and Hoisting Works, to whom the Public are referred:

- | | |
|--|--|
| 1-Eight-foot wheel, running Onoida Co.'s Mill, Amador county, Cal.; 60 stamps. Rob't Robinson, Supt. | 1-Eight-foot wheel, hoisting and driving pump at same company's mine. John Trezloan, Supt. |
| 1-Eight-foot wheel, running Con. Amador Mining Co.'s Mill, Amador county, Cal.; 40 stamps and two Hepburn pans. David Davis, Supt. | 1-Four and one-half foot wheel, running Bunker Hill Mining Co.'s Mill, Amador county, Cal.; ten stamps. John Palmer, Supt. |
| 1-Eight-foot wheel, running Lincoln Gold Mining Co.'s Mill, Amador county, Cal.; 40 stamps. | 1-Four and one-half foot wheel, running Gold Mountain Mining Co.'s Mill, Amador county, Cal.; ten stamps. J. C. Goodman, Supt. |
| 1-Eight-foot wheel, running pump at same company's mine. S. D. R. Stewart, Supt. | 1-Six-foot wheel, running St. Patrick's Mill, Newcastle, Placer county, Cal.; 15 stamps. Jno Townsend, Supt. |
| 1-Eight-foot wheel, running Keystone Con Mining Co.'s Mill, Amador county, Cal.; 40 stamps. | 1-Eight-foot wheel, hoisting and running pump, compressor and hoisting at Sheba Silver Mining Co.'s Mine, State of Nevada. |
| 2-Four and one-half foot wheels, used in hoisting by reversible water power at same company's mine. O. C. Hewitt, Supt. | 1-Four and one-half foot wheel, running Lusk Q. M. Co.'s Mill; ten stamps, Oregon. |
| 1-Four and one-half foot wheel, running Original Co.'s Mill, Amador county, Cal.; 40 stamps, one pan, one rock-breaker. J. R. Jobus, Supt. | 1-Four and one-half foot wheel, running Republic Mill; 20 stamps, Nevada county, Cal. E. H. Dyer, Supt. |
| 1-Four-foot wheel, running Over Mining Co.'s new Mill, Amador county, Cal.; 20 stamps. | 1-Six-foot wheel, at the Plumas Eureka, running 48 stamps, two pans, two rock-breakers. Wm. Johns, Supt. |
| 1-Eight-foot wheel, running same company's old Mill; ten stamps. John Palmer, Supt. | 2-Six-foot wheels, sent up to Sierra Buttes Mines, one to run 50 stamps and the other to run pans. |
| 1-Six-foot wheel, running Talisman Mining Co.'s Mill, Amador county, Cal.; ten stamps. | 1-Six and 2 Four and one-half foot wheels, sent to Sauls-burg Mine, Sonora, Toluamue Co. J. Leechman, Supt. |

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Recent Improvements,

Made especially to meet the requirements of the heavy work of this Coast, are now giving perfect satisfaction in the many mills in which they are in use.

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NO. 218 SANSOME ST., S. F. FIFTY
CENTS, from five to eight p. m. Visitors to S. F. should
try the Palace.

Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending June 6.	Week Ending June 13.	Week Ending June 20.	Week Ending June 27.
Alpha.	114 101	123 111	131 110	124 101
Alta.	61 64	81 68	81 70	74 74
Andes.	500 400	500 400	500 350	400 350
Argenta.	250 100	300 100	300 100	400 100
Baltimore Con.	2.75 2.40	3 2.50	4.05 3.2	5.4 4.20
Belmont.	2.75 2.40	3 2.50	4.05 3.2	5.4 4.20
Best & Belcher.	4.75 4.10	6.3 4.45	5.4 5.1	5.8 4.80
Bechtel.	2 2	2.40 1.1	2.20 1.70	2.1 2.1
Bodie.	3.45 1.1	2.25 1.2	2.10 1.4	4.10 4.10
Benton.	2 2.50	3 2.15	3 2.15	2 2.15
California.	1.95 1.85	1.95 1.70	1.95 1.85	2 2.15
Challenger.	211 201	211 191	181 181	181 181
Chollar-Potosi.	2 2	2 2	2 2	2 2
Confidence.	1.20 75c	1 85c	85c 85c	80c 80c
Crown Point.	1.40 1.30	1.40 1.30	1.40 1.30	1.40 1.30
Day.	30c 30c	30c 30c	30c 30c	30c 30c
DeFrees.	50c 50c	50c 50c	45c 45c	50c 50c
Durfee.	50c 50c	50c 50c	50c 50c	50c 50c
Excelsior.	2.95 2.60	4.05 3.40	3.15 3.1	2.90 2.90
Endowment.	85c 85c	85c 85c	85c 85c	85c 85c
Gen. Priz.	3.70 3.50	5 4	4 3.4	5.30 5.30
Gila.	1.0 75c	80c 70c	75c 65c	65c 60c
Goldfield.	40c 40c	30c 30c	30c 30c	30c 30c
Gold & Curry.	40c 40c	30c 30c	30c 30c	30c 30c
Hale & Nor.	1.40 1.30	1.40 1.30	1.40 1.30	1.40 1.30
Hussey.	35c 30c	30c 20c	25c 25c	10c 10c
Imperial.	81 71	81 71	81 71	71 6
Justice.	4 3.50	4 3.80	3.45 4	4 4
Kentuck.	2 2	2 2	2 2	2 2
K K Con.	2 2	2 2	2 2	2 2
Kosuth.	2 2	2 2	2 2	2 2
Lafayette.	2 2	2 2	2 2	2 2
Lafayette.	2 2	2 2	2 2	2 2
Leads.	1.40 1.30	1.40 1.30	1.40 1.30	1.40 1.30
Modoc.	2 1.70	2 1.65	1.65 1.30	1.30 1.30
Manhattan.	7 6	6 6	6 6	6 6
Marathon.	101 101	121 101	121 121	121 121
Mexican.	50c 40c	50c 35c	40c 40c	40c 40c
New York.	1.20 1.10	1.40 95c	80c 75c	40c 30c
Navajo.	20c 15c	15c 10c	15c 10c	30c 30c
Occidental.	20c 15c	15c 10c	15c 10c	30c 30c
Ophir.	131 111	131 121	131 121	121 12
Overman.	131 111	131 121	131 121	121 12
Panther.	131 111	131 121	131 121	121 12
Raymond & Ely.	4 3.80	4 3.80	4 3.2	4 3.85
Rock Island.	111 101	111 101	111 101	111 101
Savage.	131 111	131 101	131 101	131 101
Sierra Nevada.	4.15 4	4 3.40	4 5.1	4.20 4.20
Silver Hill.	1.70 1.50	1.50 1.40	1.30 1.30	1.30 1.30
Succor.	20c 15c	15c 10c	15c 10c	30c 30c
Union Con.	2.50 2.30	2.30 2.10	2.10 2.1	1.35 1.35
Trojan.	35c 25c	45c 35c	30c 40c	25c 25c
Upham.	4 3.85	4 4.90	4 3.95	6 5
Utah.	81 81	81 81	81 81	81 81
Ward.	40c 35c	40c 30c	30c 30c	30c 30c
Yellow Jacket.	88 8	8 8	8 8	8 8

Sales at S. F. Stock Exchange.

Friday A. M. June 21.		300 Bodie.	40@35c
355 Alpha.	127@127.5	500 Belmont.	50c
360 Alta.	128@128	500 Bodie.	50c
23 Andes.	400	500 California.	13@13.13
400 Bullion.	51	400 Chollar.	25c
240 Best & Belcher.	131@131	400 Chollar-Potosi.	25c
400 Belmont.	4.30@4.30	400 DeFrees.	50c
500 Benton.	2.10	1000 Endowment.	85c
305 California.	18@18.18	1170 Oaledonia.	2.15@2.15
1335 Con Virginia.	13@13.13	200 Con Washoe.	30c
1100 Crown Point.	51@51	1500 C P Ravine.	30c
200 Con Washoe.	30c	500 DeFrees.	50c
450 Con Imperial.	80@85c	150 Endowment.	85c
100 Confidence.	4	345 Excelsior.	3.20@3.15
600 Crown Point Rav.	30c	300 Eureka Con.	56@56
110 California.	3.60@3.6	1000 Falcun.	25c
130 Gold & Curry.	25c	100 Gold & Curry.	25c
215 Excelsior.	3.20	20 Grand Prize.	4
60 Gold & Curry.	81	600 Gila.	80@85c
140 Hale & Nor.	74@74	250 Hussey.	20c
1015 Justice.	3.60@3.6	300 Hale & Nor.	74@74
400 Kentuck.	2.85@2.85	150 Hillside.	10c
935 Modoc.	13@13.13	650 Independent.	1.40@1.45
50 New York.	35c	110 Justice.	3.55
30 Ophir.	131@131	3750 Julia.	7@7.71
150 Overman.	131@131	350 Kentuck.	3.40@3.4
1025 Nevada.	11@11.11	100 Leviathan.	20c
240 Sierra Nevada.	4.30	630 Leopold.	50c
420 Silver Hill.	14@14.20	130 Mexican.	13@13.13
1000 Silver Hill.	14@14.20	135 Manhattan.	6.55
600 Succor.	15c	825 New York.	55@55c
75 Utah.	81@81	20 Northern Belle.	10c
115 Union Con.	51	173 Navajo.	45@45c
1150 Ward.	1.55@1.55	400 Ophir.	48@48c
130 Wells Fargo.	35c	350 Overman.	13@13.13
330 Yellow Jacket.	88@88	200 Raymond & Ely.	4.20
AFTERNOON SESSION.			
1150 Argenta.	40c	400 Succor.	15c
550 Alps.	121@121	400 Succor.	15c
150 Alta.	74	100 Silver Hill.	10c
600 Bodie.	11@11.11	50 Silver King.	15c
225 Belle Isle.	10c	650 Trojan.	30c
135 Benton.	20c	50 Troj.	20c
300 Belcher.	4.40@4.4	230 Union Con.	51@51
100 Bechtel.	2.1	1300 Wells Fargo.	30c
500 Belmont.	50c	2700 Ward.	1.1@1.10
50 California.	13@13.13	10 Yellow Jacket.	88
2735 DeFrees.	4.30@4.3	1000 Argenta.	40c
230 Day.	30c	185 Best & Belcher.	14@14.14
100 Endowment.	75@75c	1300 Bodie.	50c
415 Excelsior.	3.20@3.2	350 Belcher.	51@51
450 Falcun.	35c	200 Bullion.	51@51
570 Grand Prize.	4.4@4.4	100 Bechtel.	2.1
1070 Gila.	65c	240 Bodie.	50c
50 Gold & Curry.	6	1450 Con Virginia.	13@13.13
600 Hussey.	20@20c	100 Con Washoe.	30c
100 Hillside.	1.40	860 Con Imperial.	93@93c
50 Hamburg.	2	2705 Crown Point.	51@51
10 Hale & Nor.	74@74	10 Chollar.	25c
1530 Independent.	1.4@1.4	570 California.	2.40@2.45
110 Julia.	7.71	400 Excelsior.	3.1@3.20
400 Kentuck.	3.30@3.3	400 Gold & Curry.	6.1@6.1
100 Leeds.	1.30	130 Hale & Nor.	74@74
400 Leopold.	50c	430 Justice.	3.55
475 Modoc.	14@14.14	1820 Julia.	7
85 Manhattan.	6.55	480 Kentuck.	3.4@3.40
30 Mexican.	13@13.13	160 Leviathan.	20c
49 Northern Belle.	10c	1315 Mexican.	13@13.13
215 Nevark.	1.40@1.4	450 New York.	55@55c
50 New Coso.	70@70c	350 Ophir.	48@48c
150 Navajo.	30c	115 Overman.	13@13.13
40 Ophir.	48c	350 Sierra Nevada.	4.30
600 Savage.	11@11.11	20 Seg Belcher.	20
510 Silver Prize.	6@6.10	270 Ward.	1.1@1.11
71 Tipit.	1.30	210 Silver Hill.	14@14.20
21 Union Con.	51@51	500 Succor.	15c
7 Ward.	1.55@1.55	1000 Utah.	81@81
Saturday A. M. June 22.			
121 Andes.	51@51	115 Union Con.	51@51
121 Alpha.	121	1300 Wells Fargo.	30c
131 Argenta.	40c	1350 Ward.	1.1@1.1
50 Alta.	1.10	1350 Yellow Jacket.	88@88
300 Bullion.	51@51	300 Alta.	8
510 Benton.	2.1@2.1	200 Alps.	1.05@1
131 Best & Belcher.	131	825 Argenta.	40c
30 Belle Isle.	20c	600 Belmont.	50c
1215 Belcher.	4.55@4.5	70 Bechtel.	11@11
130 Bechtel.	2.20@2.2	1390 Belcher.	51@51

90 Best & Belcher.	131@131	550 Leopard.	50@45c	
525 Bodie.	41@41	530 Modoc.	14@1.30	
100 Con Virginia.	131	300 Manhattan.	6.2@6.2	
150 California.	17@17.17	300 Mexican.	13@13.13	
50 Caledonia.	2.45	425 Navajo.	45@40c	
40 Chollar.	25@25.25	45 Northern Belle.	11	
830 Crown Point.	51	50 New Coso.	50c	
50 Eureka Con.	56	150 Ophir.	48c	
40 DeFrees.	30@40c	150 Raymond & Ely.	4@3.95	
50 Falcon.	20c	800 Silver Prize.	1.45	
1210 Endowment.	80c	100 Star.	1.5c	
50 Gila.	60@60c	100 Savage.	11c	
150 Gold & Curry.	6.1@6.1	150 Sierra Nevada.	4.3@4.3	
600 Hillside.	20c	50 Utah.	81c	
175 Hamburg.	21	330 Union Con.	51@51	
50 Hale & Nor.	74@74	650 Ward.	1.1	
1040 Independent.	1.4@1.4	410 Yellow Jacket.	88@88	
300 Kentuck.	3.40	10 Alta.	80@71	
800 Modoc.	1.30@1.3	350 Andes.	40c	
270 Manhattan.	6.2@6.2	315 Best & Belcher.	14@14.14	
230 Mexican.	13@13.13	110 Belcher.	4.55@4.5	
300 New Coso.	70c	650 Benton.	2.30@2.3	
40 Navajo.	50c	810 Bullion.	4.5@4.5	
105 Newark.	1.2@1.2	50 Boyle.	40c	
135 Northern Belle.	10c	1330 California.	15@15.15	
50 Ophir.	48c	350 Chollar.	13@13.13	
300 Overman.	13@13.13	615 Excelsior.	3.15@3.1	
20 Rayd & Ely.	40c	90 Confidence.	42	
430 Silver Prize.	10@10c	1180 Con Imperial.	80@85c	
100 Star.	1.4	1340 Caledonia.	2.20@2.2	
50 Sierra King.	1.5	500 Chollar.	13@13.13	
50 Sierra Nevada.	4.3@4.3	615 Excelsior.	3.15@3.1	
420 Savage.	11@11.11	570 Gold & Curry.	6.1@6.1	
100 Union Con.	51@51	50 Hale & Nor.	74@74	
785 Ward.	1.55@1.55	850 Justice.	4.6@4.6	
Wednesday A. M. June 24.				
1200 Argenta.	40c	235 Kentuck.	3.4@3.4	
120 Alpha.	121@121	200 Leviathan.	20c	
15 Andes.	40c	530 Mexican.	13@13.13	
360 Best & Belcher.	14@14.14	500 New York.	55@55c	
130 Bodie.	51	430 Overman.	13@13.13	
1485 Belcher.	5.1@5.1	300 Ophir.	47@47.47	
600 Boyle.	40c	80 Occidental.	40c	
955 Con Virginia.	13@13.13	1615 Sierra Nevada.	4.45@4.45	
1030 California.	17@17.17	200 Solid Silver.	1.30	
700 Chollar.	13@13.13	750 Silver Hill.	14@14.20	
845 Crown Point.	7@7.7	800 Succor.	10c	
780 Caledonia.	2.4@2.4	300 Trojan.	30c	
1380 Con Imperial.	80@80c	300 Union Con.	51@51	
700 Gold & Curry.	6.1@6.1	375 Utah.	81@81	
150 Excelsior.	3.15	125 Utah.	81@81	
395 Gold & Curry.	6.1	600 Wells Fargo.	1.35@1.3	
300 Hale & Nor.	74	6200 Ward.	20@15c	
1495 Justice.	3.2@3.2	20 Woodville.	30c	
450 Kentuck.	3.45@3.4	50 Yellow Jacket.	88	
675 Leviathan.	15c	AFTERNOON SESSION.		
1470 Mexican.	13@13.13	1050 Alps.	50@45c	
250 Modoc.	14	700 Arizana.	40c	
320 Northern Belle.	10c	10 Alta.	74	
500 New York.	50@70c	400 Belmont.	35c	
75 Overman.	13@13.13	400 Bechtel.	2.1@2.1	
30 Ophir.	48@48c	350 Bullion.	47@47c	
1140 Sierra Nevada.	4.3@4.3	400 Belcher.	12@12.12	
200 Best & Belcher.	14@14.14	465 Crown Point.	51	
610 Silver Hill.	1.30@1.3	2635 Con Virginia.	13@13.13	
1875 Succor.	10c	800 California.	15@15.15	
1375 Trojan.	35@40c	2800 Con Imperial.	80c	
845 Union Con.	51@51	100 Day.	30c	
700 Wells Fargo.	20@20c	100 DeFrees.	50c	
1575 Ward.	1.55@1.55	150 Endowment.	85c	
80 Yellow Jacket.	88	155 Eureka Con.	56@56	
AFTERNOON SESSION.				
50 Alps.	50c	210 Excelsior.	3.15	
150 Alpha.	121@121	670 Grand Prize.	10c	
175 Argenta.	40c	1300 Gila.	65@65c	
195 Best & Belcher.	14@14.14	25 Hamburg.	21	
150 Bodie.	4.3@4.3	81 81	81	
350 Belmont.	35@40c	125 Hillside.	21	
60 Bullion.	51	300 Independent.	1.20@1.2	
325 Bodie.	41@41.10	1310 Julia.	61	
400 Bechtel.	2.2	20 Kentuck.	3.3	
300 Con Virginia.	13@13.13	450 Leopard.	45@40c	
1370 California.	17@17.17	400 Leeds.	1.30	
1775 Con Imperial.	90c	100 Manhattan.	6.3	
990 Crown Point.	61@61	550 Modoc.	14	
500 Caledonia.	2.45	780 Mexican.	13@13.13	
810 DeFrees.	40c	500 New Coso.	50c	
200 Endowment.	80c	300 Northern Belle.	11	
120 Eureka Con.	57@57c	320 Navajo.	40@45c	
50 Falcon.	15c	400 Ophir.	48@48c	
220 Grand Prize.	4.4@4.4	400 Raymond & Ely.	4.3@4.3	
220 Gold & Curry.	6.1@6.1	40 Raymond & Ely.	4.3@4.3	
635 Gila.	80@80c	200 Savage.	11@11.11	
175 Hamburg.	21	60 Sierra Nevada.	4.35@4.3	
400 Hussey.	10c	200 Star.	1.35	
200 Con Washoe.	30c	200 Silver Prize.	1.55@1.5	
990 Independent.	1.1@1.1	200 Tipot.	1.65@1.6	
3745 Julia.	61@61	100 Ward.	1.30	
325 Justice.	3.35	20 Yellow Jacket.	74@74	
100 Young America.				25c

SALES OF LAST WEEK AND THIS COMPARED

Thursday A. M. June 20.		Thursday A. M. June 27.	
50 Alpha.	74@74	300 Alpha.	74@74
5 Best & Belcher.	13	210 Andes.	35@40c
400 Bullion.	51@51	470 B & B.	13@13.13
700 Benton.	2.10	225 Bullion.	4.85@4.85
85 Belcher.	4.3@4.3	300 Bodie.	51@51
100 Boyle.	40@45c	200 Boyle.	35@35c
935 Con Imperial.	90@95c	900 Crown Point Rav.	20c
1005 California.	18	1325 California.	15@15.15
1705 Con Virginia.	13	300 Caledonia.	2.15@2.15
730 Modoc.	14	250 Chollar.	13@13.13
110 Chollar.	25@25c	1540 Con Virginia.	13
1050 Crown Point Ravine.	20c	990 Crown Point.	51@51
Con Washoe.	20c	2100 Con Imperial.	80c
325 Crown Point.	50@51	535 Exchequer.	2@2.0
400 Caledonia.	2.10	250 Exchequer.	61@61
400 Exchequer.	31@31.13	425 Hale & Nor.	1@1
1005 Gold & Curry.	6	250 Justice.	3.90@3.95
80 Hale & Nor.	7@7.1	230 Julia.	6
550 Julia.	51@51	70 Kentucky.	2.95
400 Kentuck.	2.80	200 Leviathan.	12@12.11
400 Leviathan.	12@12.11	90 Ovelman.	12@11
200 Mides.	77@77.2	540 Ovelman.	43@44
200 Overman.	12@12.13	940 Sierra Nevada.	4.30
300 Succro.	41@41.50	200 Sierra Nevada.	4.30
460 Sierra Nevada.	41@41.50	935 Savage.	11@11.11
760 Silver Hill.	1.30@1.31	900 Silver Hill.	11@11.30
300 Trojan.	30@30	350 Silver Hill.	25c
303 Utah.	81@81.33	135 Utah.	84@84
215 Union Con.	4.95	4200 Wells Fargo.	15c
100 Wells Fargo.	1.95@1.95	200 Woodville.	30c
410 Yellow Jacket.	35@38	300 Yellow Jacket.	30c
100 Yellow Jacket.	35@38	225 Yellow Jacket.	75
AFTERNOON SESSION.		AFTERNOON SESSION.	
Alpha.	73@71	330 Alpha.	30@84
400 Alpha.	35@40c	70 Alps.	40c
450 Argenta.	35@40c	550 Argenta.	35@40c
500 Belmont.	50c	100 Alpha.	11@11.11
40 Best & Belcher.	13	450 Bodie.	1@4.05
500 Bodie.	4.05@4.05	300 Belmont.	35c
50 Bullion.	51	165 Bechtel.	1
600 Bechtel.	2.01@.95	210 Best & Belcher.	15@14.15
400 Bodie.	31@31.70	550 Bodie.	11@11.11
200 Combination.	3@3	635 Belcher.	4.45@6.15
50 Chollar.	24	135 Con Virginia.	13
300 Con Virginia.	13	1330 Crown Point.	51@51
450 Caledonia.	2.15	300 Con Imperial.	80c
750 Crown Point.	11@11.11	550 DeFrees.	11@11.11
420 Con Imperial.	90@95c	6700 DeFrees.	50c
50 Day.	35c	20 Eureka Con.	57
350 DeFrees.	50@40c	20 Exchequer.	3@3.05
145 Exchequer.	5@5	100 Falcon.	1
100 Exchequer.	5@5	1000 Falcon.	1
50 Exchequer.	5@5	900 Gold.	95c
150 Grand Prize.	4.40@4.41	110 Gold & Curry.	6
40 Gold.	60@70c	1150 Hanks.	20@21
40 Gold & Curry.	25	350 Hanks.	20@21
500 Hussey.	25	200 Homestake.	20@21
400 Hussey.	25	1250 Independent.	11@11.45
220 Hamburg.	3@2	2115 Justice.	63@67
200 Hornet.	3@2	1150 Justice.	3.90@3.95
400 Independent.	4@13	65 Lead.	4
1175 Jackson.	6@6.13	50 Martin White.	4
110 Julia.	6@6	700 Modoc.	1.20@1.15
70 Kentucky.	2.80	25 Manhattan.	9@9.15
100 Leonard.	40@40c	685 Manhattan.	13@13.11
100 Leda.	1.20	50 New Coso.	50c
200 Manhattan.	61@63	200 New York.	50c
650 Modoc.	13@13.13		

PATENTS AND INVENTIONS.

List of U. S. Patents Issued to Pacific Coast Inventors.

[From Official Reports for the Mining and Scientific Press, DEWEY & CO., Publishers and U. S. and Foreign Patent Agents.]

By Special Dispatch from Washington, D. C.

WEEK ENDING JUNE 11TH.
MACHINE FOR CRUSHING AND GRINDING ORES, ETC. THOS. MCGLEW, S. F.
MIDDLING SEPARATORS.—Berthold Newell, Sacramento, Cal.
POCKET FOR GARDENERS.—Thorold Greenbaum, S. F.
SPARK EXTINGUISHERS.—John Johnson, Bloomfield, Cal.
GEAR CUTTING MACHINES.—John A. Peet, S. F.
HAY PRESSES.—Jacob Price, San Leandro, Cal.
HATCHES FOR STREET ELEVATORS.—Philip Hinkle, S. F.
BROOM SEWING MACHINES.—Lionel Varicus, S. F.
BUTTON HOLE SEWING MACHINES.—Eugene, Moreau, S. F.

TRADEMARKS.
SODA AND CREAM OF TARTAR.—Charles R. Burrage, S. F.
COAL OIL.—M. Ehrman & Co., S. F., and New York, N. Y.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.
NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO. at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

THE estate of the late William C. Rheinlander is estimated to be worth about \$30,000,000. He was one of the seven largest real-estate owners in New York city. By his will his vast property will be managed by executors for the benefit of his children, who may divide it as they shall see fit.

THE trotting-horse, "Hiram," owned by H. Eldred, fell dead while trotting a race at Sacramento on Saturday last.

Woodward's Gardens were never more attractive than at present. Besides three lions already mentioned, six monster living alligators, several iguanas and a boa-constrictor have just been added. New stars are constantly engaged for the Pavilion exercises. Rates of admission as usual.

EXAMINE the accelerated endowment plan, as originated by the Mutual Benefit Life Insurance Co., of Newark, New Jersey. Assets, \$30,533,429.94. Lewis C. Crover, President; L. Spencer Coghle, Vice-President; Benjamin C. Miller, Treasurer; Edward A. Strong, Secretary; Bloomfield J. Miller, Actuary. Send for circulars to James Muncie, Jr., agent of insured, 224 Sansome St., San Francisco.

MR. W. J. WOOLLEY, who took out a Canadian Patent some four years ago, is requested to call at the MINING AND SCIENTIFIC PRESS PATENT AGENCY OFFICE. Business of importance.

MODEL MAKER AND MACHINIST.—I. A. Heald, No. 51 Commercial St., San Francisco, (fourth floor).

GENERAL MERCHANDISE.

[WHOLESALE.]

WEDNESDAY N., June 26, 1878

BACON—Jobbing.
Egg Standard Wheat, 11 1/2 @ 11 1/2
Neville & Co's 11 1/2 @ 11 1/2
Hand Sewed, 2x36, 11 1/2 @ 11 1/2
24x36 13 @ 13 1/2
Machine Sewed, 47 1/2 @ 47 1/2
Flour Sacks, halves 8 1/2 @ 8 1/2
Quarters 5 @ 5
Eighths 4 @ 4
Hessian, 50 inch 15 @ 15
45 inch 12 @ 12
40 inch 9 @ 9
Wool Sacks
Hand Sewed, 3 1/2 lb. 47 1/2 @ 47 1/2
4 lb. do 48 @ 48
Machine Sewed, 47 1/2 @ 47 1/2
Standard Gunnies 14 @ 15
Bean Bags 7 @ 8

CANDLES.
Crystal Wax 17 @ 17
Eagle 12 @ 12
Patent Sperm 30 @ 34

CANNED GOODS.
Assorted Pie Fruits
2 lb. cans 2 1/2 @ 2 1/2
Tahle do 3 1/2 @ 3 1/2
Jams and Jellies 4 1/2 @ 4 1/2
Pies, 1/2 gal. 3 1/2 @ 3 1/2
Sardines, 8 oz. box 1 1/2 @ 1 1/2
H. Boxes 10 @ 10

PAINTS.
Preserved Beef 4 00 @ 4 00
2 lb. doz 4 00 @ 4 00
do Beef, 4 lb. doz 5 50 @ 5 50
Preserved Mutton 2 1/2 @ 2 1/2
do 2 1/2 @ 2 1/2
Beef Tongue 5 50 @ 5 50
Preserved Ham 2 1/2 @ 2 1/2
do 2 1/2 @ 2 1/2
Deviled Ham, 1 lb. 3 50 @ 3 50
do Ham, 1/2 doz 3 00 @ 3 00

COAL—Jobbing.
Australian, ton 7 00 @ 7 25
Coke Bay 6 50 @ 7 00
Bellingham Bay 6 50 @ 6 50
Seattle 5 50 @ 6 50
Cumberland 14 00 @ 14 00
Mt. Diablo 4 75 @ 6 00
Lehigh 22 00 @ 22 00
Liverpool 7 00 @ 8 00
West Hartley 7 50 @ 9 00
Scotch 6 50 @ 8 00
Scranton 13 00 @ 16 00
Vancouver Id. 7 50 @ 7 50
Charcoal, sack 75 @ 75
Coke, bbl 60 @ 60

COFFEE.
Sandwich Id. b. 21 @ 21
Costa Rica 18 @ 18
Guatemala 17 @ 18
Java 22 @ 23
Manila 17 1/2 @ 17 1/2
Ground, in c. 25 @ 25

FISH.
Sae to Dry Cod 5 @ 5
do in cases 5 1/2 @ 5 1/2
Eastern Cod 8 @ 8
Salmon, bbls 9 00 @ 10 00
H. bbls 5 00 @ 5 50
2 lb cans 3 10 @ 3 20
Pikd Cod bbls 22 00 @ 22 00
H. bbls 11 00 @ 11 00
Mackerel, No. 1 11 00 @ 12 00
In Kits 2 25 @ 2 25
Ex Mess 3 50 @ 4 50
Pikd Herring, 1/2 doz 3 00 @ 3 50
Boston Smoked H. 4 00 @ 5 00

LIME, ETC.
Lime, Sta Cruz 2 00 @ 2 25
Cement, Roman 2 75 @ 3 50
Portland 2 75 @ 3 50

METALS.

[WHOLESALE.]

WEDNESDAY, M., June 26, 1878.

IRON.
American 28 00 @ 30 00
Scotch 28 00 @ 30 00
White 28 00 @ 30 00
Oregon 21 @ 21
Belmont 5 00 @ 5 00
Horse 7 @ 7
Nail 7 @ 7

COPPER.
Sheet 34 @ 35
Sheet Yellow 12 @ 12
Comp. Sails 24 @ 24
Comp. Sails 24 @ 24

STEEL.
Engl. B. 13 @ 14
Anti-Wood, ordinary sizes 15 @ 15
Drill 15 @ 15
Flat 14 @ 19
Plov 8 @ 12 1/2

TIN.
10 lb. barrel 7 50 @ 8 50
Bar 23 @ 24
An 17 @ 17 1/2

ZINC.
By 9 @ 9
Zn 7x3 ft, 7 to 10, lb. 9 @ 10
7x14 10 @ 10
8x10 11 @ 11
8x10 11 @ 11

NAILS.
Alizes 3 15 @ 35 25
QUER 43 @ 45

Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, June 26, 3 P. M.

TENDERS IN S. F., 11 A. M., 99 1/2 @ 99 1/2. SILVER 2 1/2 @ 2 1/2.
In New York, 1000
SARS, 800 @ 910. SILVER BARS, 8 @ 15 1/2 cent. dis

NOTES ON NEW YORK, 1/2; on London bankers, 3/4 @ 3/4.
Commercial, 50; Paris, 1/2 francs @ 1/2 dollar; Mexican 1/2 @ 1/2
In Consols 95 1/2; Bonds, 108 1/2.
SILVER IN S. F., by the Assay, 7 1/2 lb. 42 1/2.

General Service Meteorological Report.

Week Ending June 25, 1878.

HIGHEST AND LOWEST BAROMETER.									
10 June	20 June	21 June	22 June	23 June	24 June	25 June	26 June	27 June	28 June
29.87	29.83	29.98	30.03	30.00	29.94	29.83	29.87	29.79	29.81
29.87	29.79	29.81	29.90	29.95	29.83	29.87	29.87	29.79	29.81
MINIMUM AND MAXIMUM THERMOMETER.									
64	65	62	68	67	71	64	64	65	62
52	53	52	54	52	54	52	54	53	52
MEAN DAILY HUMIDITY.									
80	73	74	68	67	63	63	67	73	74
PREVAILING WIND.									
SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
WIND—MILES TRAVELED.									
280	216	311	205	248	224	224	280	216	311
STATE OF WEATHER.									
Cloudy	Fair	Clear	Cloudy	Clear	Clear	Clear	Cloudy	Fair	Clear
RAINFALL IN TWENTY-FOUR HOURS.									
Total rain during the season, from July 1, 1877, 35.18 in.									

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Gover Mining & Milling Company.—Location of principal place of business, San Francisco, Cal. Location of works, Amador County, near Drytown, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the twenty-fourth day of May, 1878, an assessment (No. 36) of fifty cents per share was levied upon the capital stock of the corporation, payable immediately in gold coin or legal currency of the United States, to the Secretary, at the office of the Company, Room 3, No. 402 Front Street, San Francisco, Cal.

Any stock upon which said assessment shall remain unpaid, on Wednesday, July tenth, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Thursday, the first day of August, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
W. O. WILSON, Secy.
Office, Room 3, No. 402 Front Street, San Francisco, Cal.

Pacific Plumbago Mining and Manufacturing Company.—Principal place of business, 228 and 220 Main Street, San Francisco. Location of works, 228 and 230 Main Street, San Francisco, Cal.
Notice is hereby given, that at a meeting of the Board of Directors, held on the seventh day of June, 1878, an assessment of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold and silver coin, to the Secretary, at the office of the Company, Room 18, No. 635 Clay Street, San Francisco.

Any stock upon which said assessment shall remain unpaid on the eighth day of July, 1878, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Thursday, the twenty-fifth day of July, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
FRANK F. GILBERT, Secy.
Office, No. 635 Clay Street, Room 18, San Francisco, Cal.

Seaton Mining Company.—Location of principal place of business, San Francisco, Cal. Location of works, Drytown Mining District, Amador County, Cal.
Notice is hereby given, that at a meeting of the Board of Directors, held on the twenty-sixth day of June, 1878, an assessment (No. 11) of seventy-five (\$75) dollars per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the Company, Room No. 18, Nevada Block, northwest corner Pine and Montgomery Streets, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the thirtieth day of July, 1878, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the twenty-first day of August, 1878, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
JOEL E. LIGHTNER, Secy.
Office, Room No. 58, Nevada Block, northwest corner of Pine and Montgomery Streets, San Francisco, Cal.

Summit Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Mineral Point Mining District, Plumas County, Cal.
NOTICE.—There are delinquent upon the following de-

scribed stock, on account of assessment (No. 3) levied on the third (3) day of May, A. D., 1878, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Boring, J. C.	32	1200	\$90 00
Byers, W. T.	38	700	35 00
Brown, M. B.	45	200	10 00
Edwards, J. E.	89	700	35 00
Gautier, Gustave.	150	200	10 00
Gladwell, G. S.	132	400	20 00
Hallsted, A. D.	102	100	5 00
Ingerson, H. H.	53	500	25 00
Ingerson, H. H.	54	500	25 00
Knevel, M.	33	1200	60 00
Knevel, Geo.	176	100	5 00
Knevel, Geo.	177	100	5 00
Knevel, Geo.	178	100	5 00
Knevel, Geo.	179	100	5 00
Knevel, Geo.	180	100	5 00
Knevel, Geo.	181	50	2 50
Knevel, Geo.	182	50	2 50
Knevel, Geo.	183	50	2 50
Knevel, Geo.	184	50	2 50
Knevel, Geo.	185	50	2 50
Knevel, Geo.	186	50	2 50
Knevel, Geo.	187	50	2 50
Knevel, Geo.	188	50	2 50
Knevel, Geo.	189	50	2 50
Knevel, Geo.	190	50	2 50
Knevel, Geo.	191	200	10 00
Knevel, Geo.	192	200	10 00
Knevel, Geo.	193	200	10 00
Knevel, Geo.	194	200	10 00
Knevel, Geo.	195	200	10 00
Knevel, Geo.	196	200	10 00
Knevel, Geo.	197	200	10 00
Knevel, Geo.	198	200	10 00
Knevel, Geo.	199	200	10 00
Knevel, Geo.	200	200	10 00
Knevel, Geo.	201	200	10 00
Knevel, Geo.	202	200	10 00
Knevel, Geo.	203	200	10 00
Knevel, Geo.	204	200	10 00
Knevel, Geo.	205	200	10 00
Knevel, Geo.	206	200	10 00
Knevel, Geo.	207	200	10 00
Knevel, Geo.	208	200	10 00
Knevel, Geo.	209	200	10 00
Knevel, Geo.	210	200	10 00
Knevel, Geo.	211	200	10 00
Knevel, Geo.	212	200	10 00
Knevel, Geo.	213	200	10 00
Knevel, Geo.	214	200	10 00
Knevel, Geo.	215	200	10 00
Knevel, Geo.	216	200	10 00
Knevel, Geo.	217	200	10 00
Knevel, Geo.	218	200	10 00
Knevel, Geo.	219	200	10 00
Knevel, Geo.	220	200	10 00
Knevel, Geo.	221	200	10 00
Knevel, Geo.	222	200	10 00
Knevel, Geo.	223	200	10 00
Knevel, Geo.	224	200	10 00
Knevel, Geo.	225	200	10 00
Knevel, Geo.	226	200	10 00
Knevel, Geo.	227	200	10 00
Knevel, Geo.	228	200	10 00
Knevel, Geo.	229	200	10 00
Knevel, Geo.	230	200	10 00
Knevel, Geo.	231	200	10 00
Knevel, Geo.	232	200	10 00
Knevel, Geo.	233	200	10 00
Knevel, Geo.	234	200	10 00
Knevel, Geo.	235	200	10 00
Knevel, Geo.	236	200	10 00
Knevel, Geo.	237	200	10 00
Knevel, Geo.	238	200	10 00
Knevel, Geo.	239	200	10 00
Knevel, Geo.	240	200	10 00
Knevel, Geo.	241	200	10 00
Knevel, Geo.	242	200	10 00
Knevel, Geo.	243	200	10 00
Knevel, Geo.	244	200	10 00
Knevel, Geo.	245	200	10 00
Knevel, Geo.	246	200	10 00
Knevel, Geo.	247	200	10 00
Knevel, Geo.	248	200	10 00
Knevel, Geo.	249	200	10 00
Knevel, Geo.	250	200	10 00
Knevel, Geo.	251	200	10 00
Knevel, Geo.	252	200	10 00
Knevel, Geo.	253	200	10 00
Knevel, Geo.	254	200	10 00
Knevel, Geo.	255	200	10 00
Knevel, Geo.	256	200	10 00
Knevel, Geo.	257	200	10 00
Knevel, Geo.	258	200	10 00
Knevel, Geo.	259	200	10 00
Knevel, Geo.	260	200	10 00
Knevel, Geo.	261	200	10 00
Knevel, Geo.	262	200	10 00
Knevel, Geo.	263	200	10 00
Knevel, Geo.	264	200	10 00
Knevel, Geo.	265	200	10 00
Knevel, Geo.	266	200	10 00
Knevel, Geo.	267	200	10 00
Knevel, Geo.	268	200	10 00
Knevel, Geo.	269	200	10 00
Knevel, Geo.	270	200	10 00
Knevel, Geo.	271	200	10 00
Knevel, Geo.	272	200	10 00
Knevel, Geo.	273	200	10 00
Knevel, Geo.	274	200	10 00
Knevel, Geo.	275	200	10 00
Knevel, Geo.	276	200	10 00
Knevel, Geo.	277	200	10 00
Knevel, Geo.	278	200	10 00
Knevel, Geo.	279	200	10 00
Knevel, Geo.	280	200	10 00
Knevel, Geo.	281	200	10 00
Knevel, Geo.	282	200	10 00
Knevel, Geo.	283	200	10 00
Knevel, Geo.	284	200	10 00
Knevel, Geo.	285	200	10 00
Knevel, Geo.	286	200	10 00
Knevel, Geo.	287	200	10 00
Knevel, Geo.	288	200	10 00
Knevel, Geo.	289	200	10 00
Knevel, Geo.	290	200	10 00
Knevel, Geo.	291	200	10 00
Knevel, Geo.	292	200	10 00
Knevel, Geo.	293	200	10 00
Knevel, Geo.	294	200	10 00
Knevel, Geo.	295	200	10 00
Knevel, Geo.	296	200	10 00
Knevel, Geo.	297	200	10 00
Knevel, Geo.	298	200	10 00
Knevel, Geo.	299	200	10 00
Knevel, Geo.	300	200	10 00

In accordance with law, and an order of the Board of Directors, made on the third (3) day of May, A

Iron and Machine Work.

HOS. PENDERGAST.

HENRY S. SMITH.

ÆTNA IRON WORKS,

MANUFACTURERS OF

IRON CASTINGS

and MACHINERY

OF ALL KINDS.

Fremont Street, bet. Howard and Folsom,

SAN FRANCISCO.

PHELPS MANUFACTURING COMPANY,

Manufacturers of all kinds of

Wharf and Bridge Bolts, Railroad Trestle Work, Car Frames and Bolts, Machine Bolts, Set Screws and Tap Bolts, Lag or Coach Screws.

ALL STYLES OF FANCY HEAD BOLTS. HOT AND COLD PRESSED HEXAGONAL AND SQUARE NUTS, WASHERS, BOLT ENDS, TURNBUCKLES, ETC., ETC.

13, 15 & 17 Drumm St., near California,

SAN FRANCISCO, CAL.

SACRAMENTO BOILER WORKS,

214 to 218 BEALE STREET,

HALL & KELSHAW,

PRACTICAL BOILER MAKERS,

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

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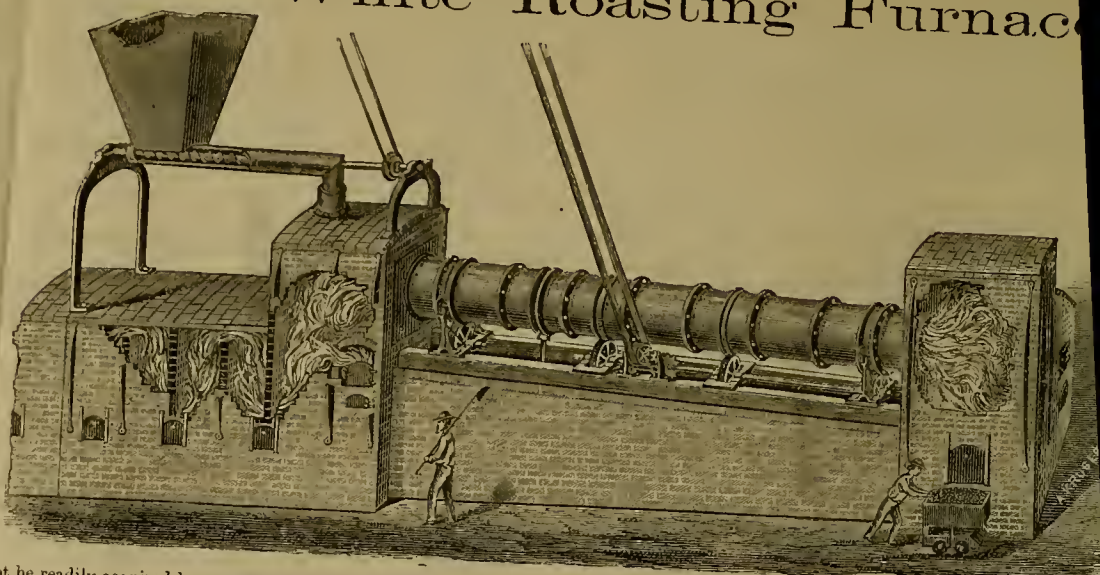
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